

**FIG. 1**

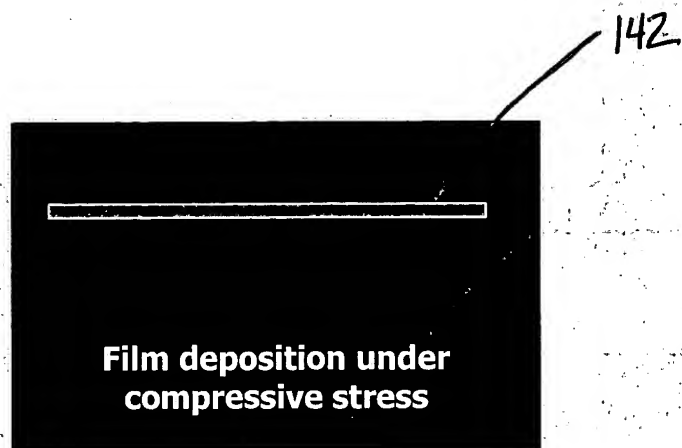


FIG. 2(a)

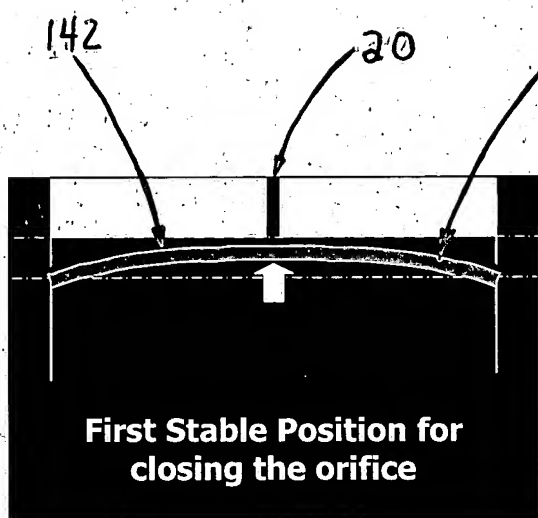


FIG. 2(b)

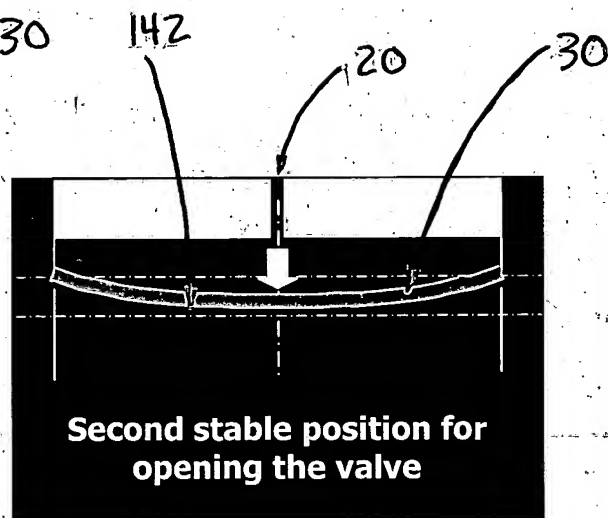
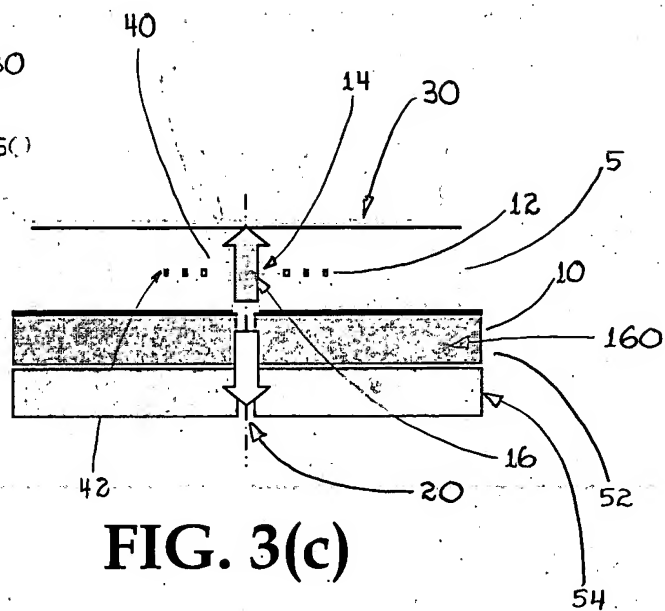
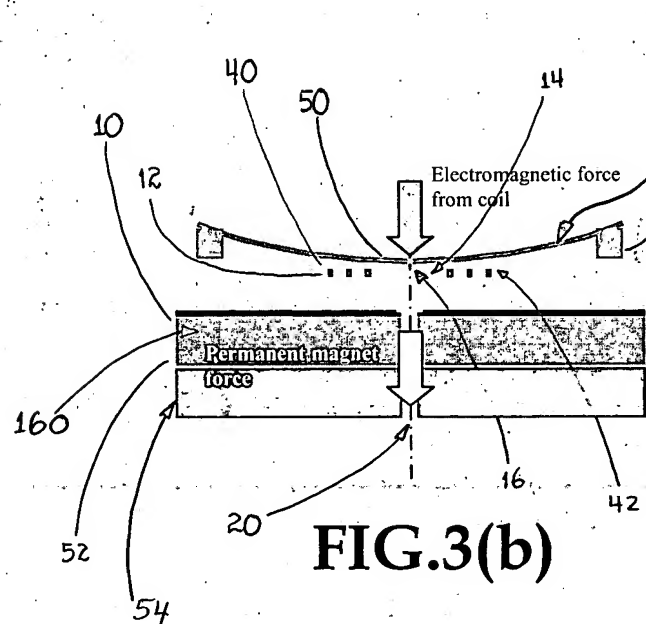
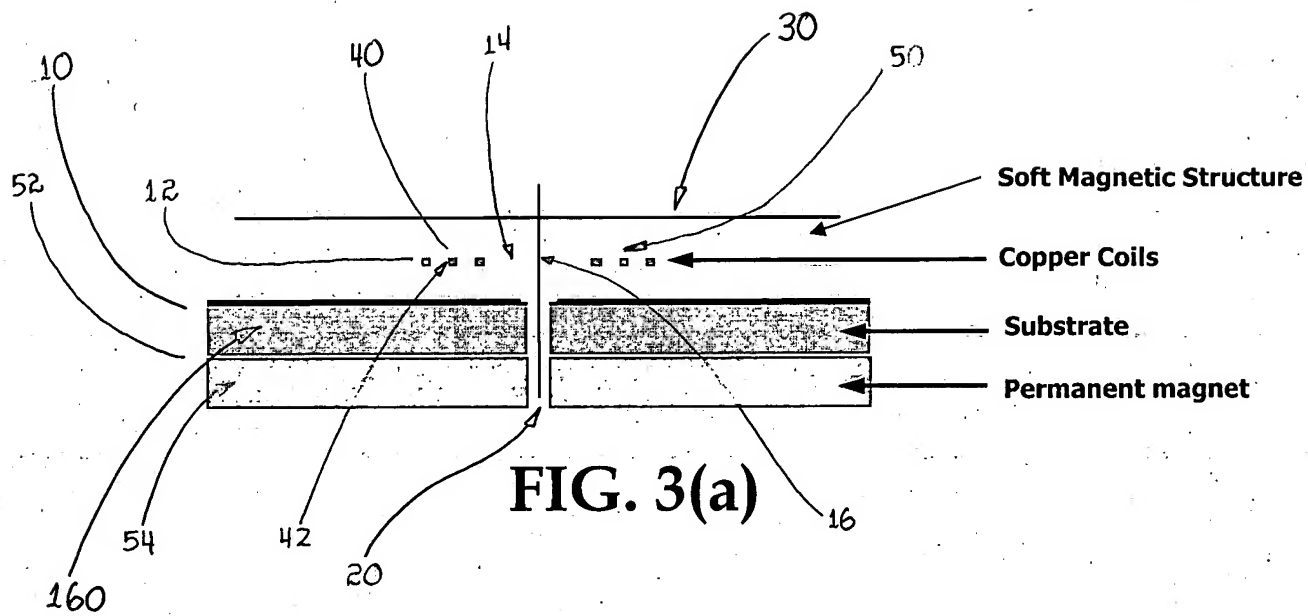


FIG. 2(c)



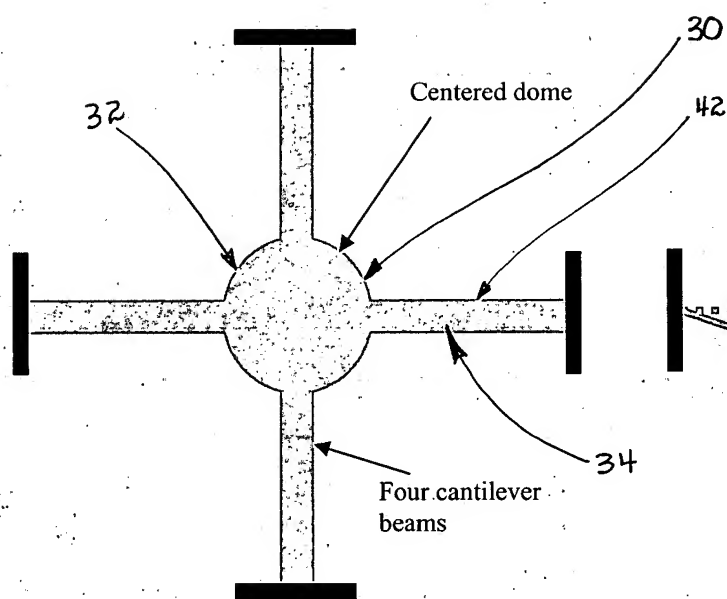


FIG. 4(a)

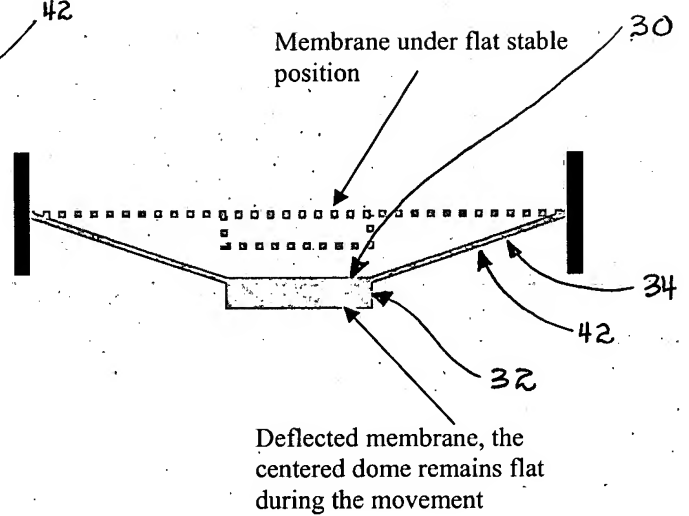
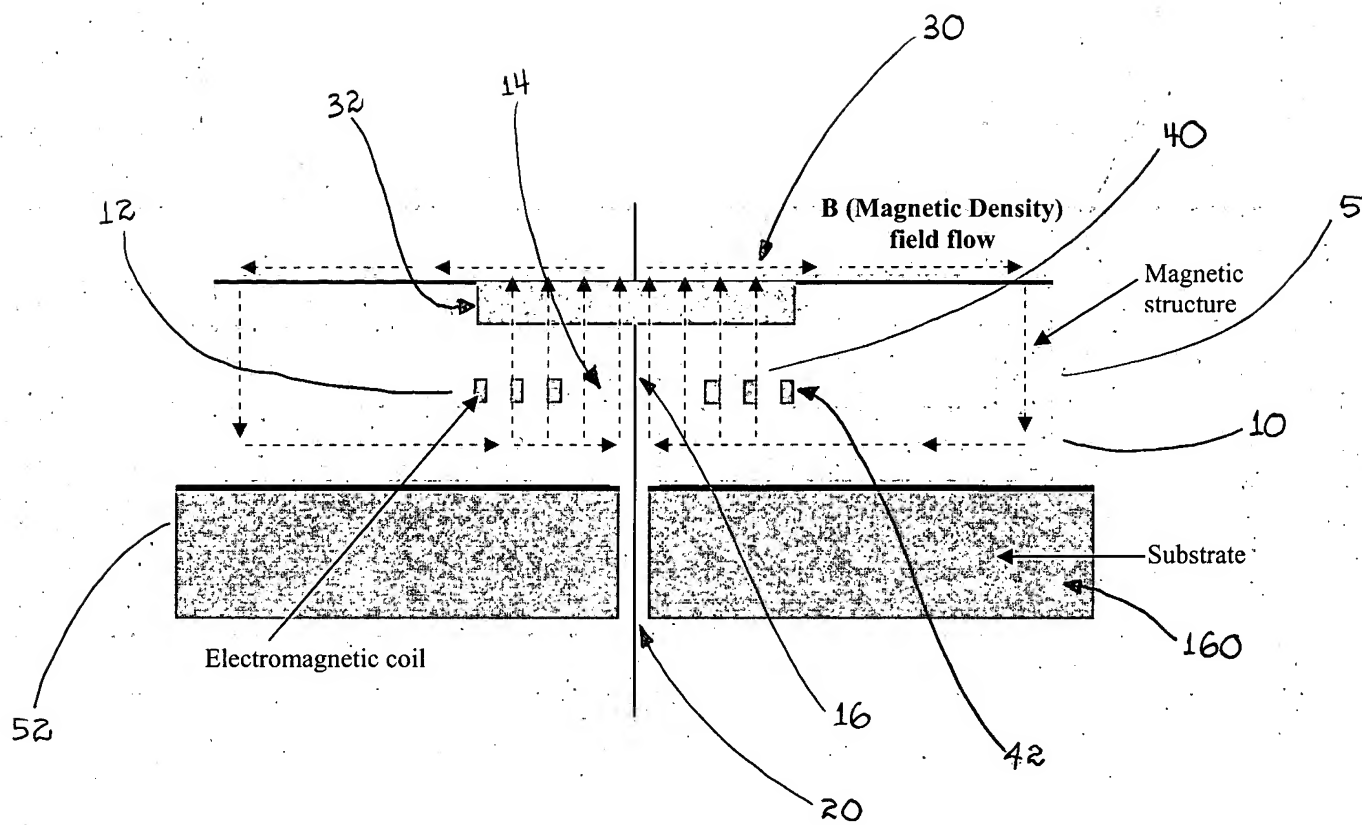
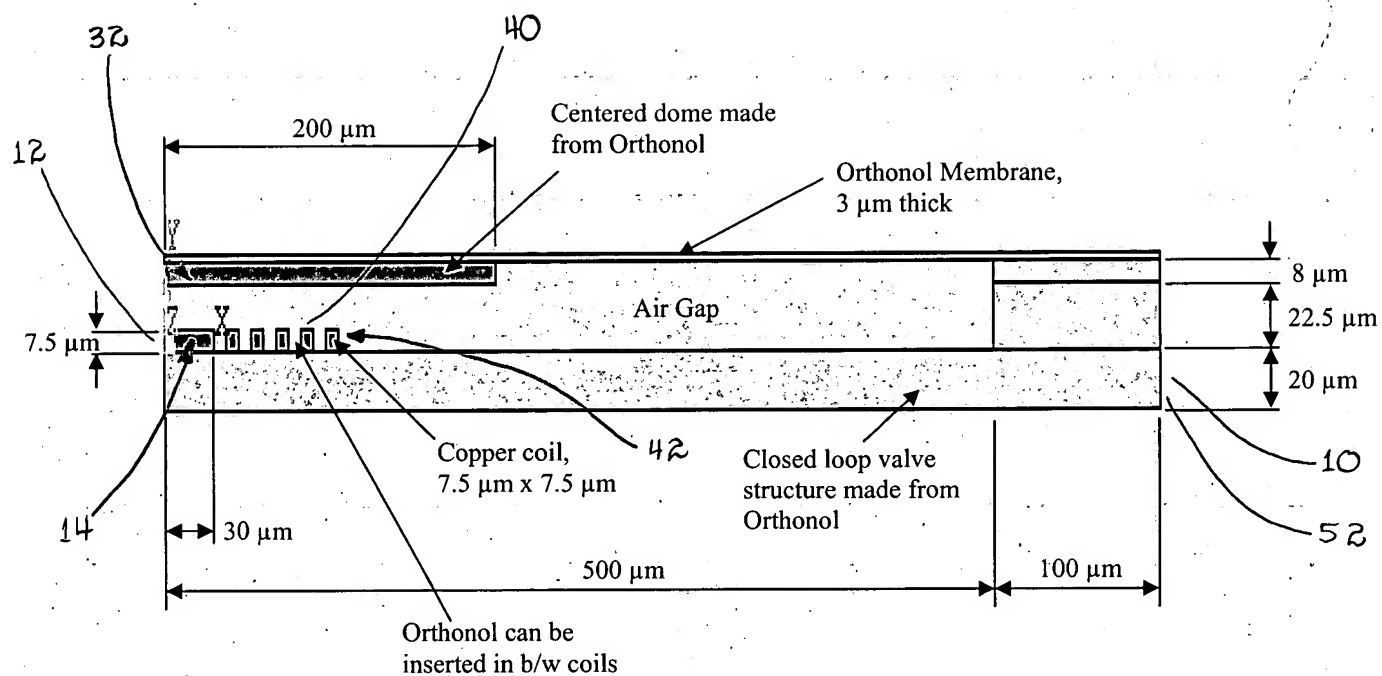


FIG. 4(b)



**FIG. 5**



**FIG. 6**

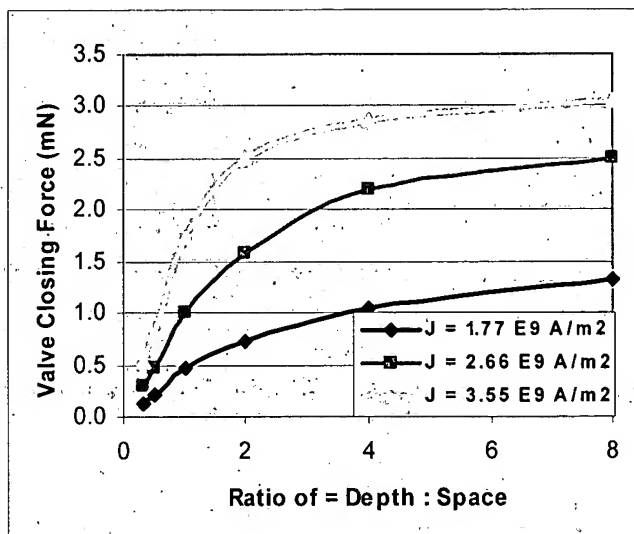


FIG. 7

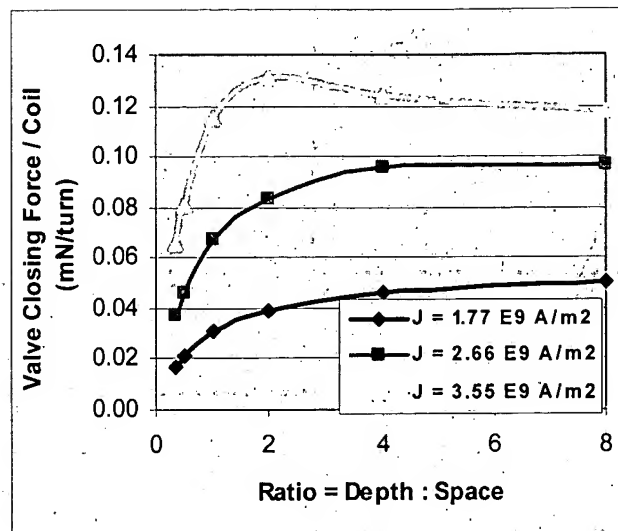


FIG. 8

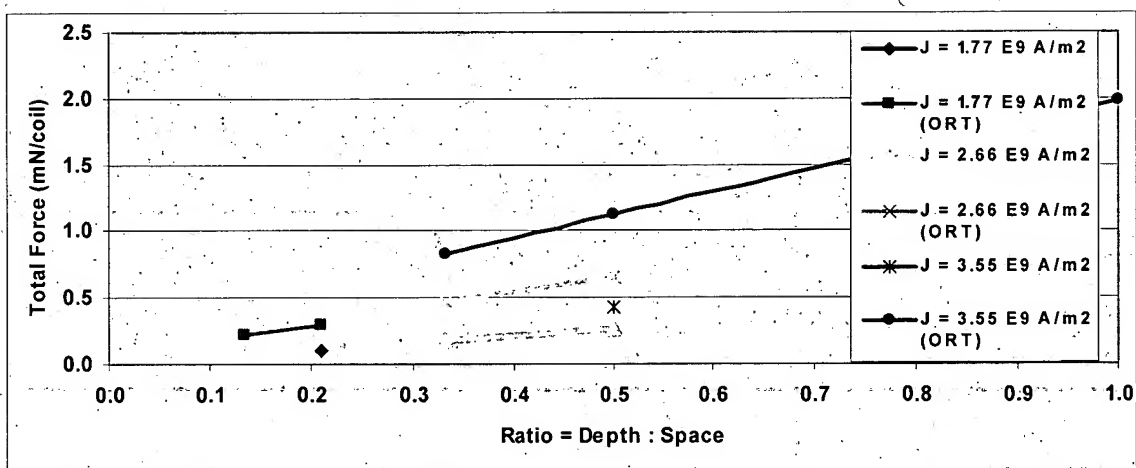
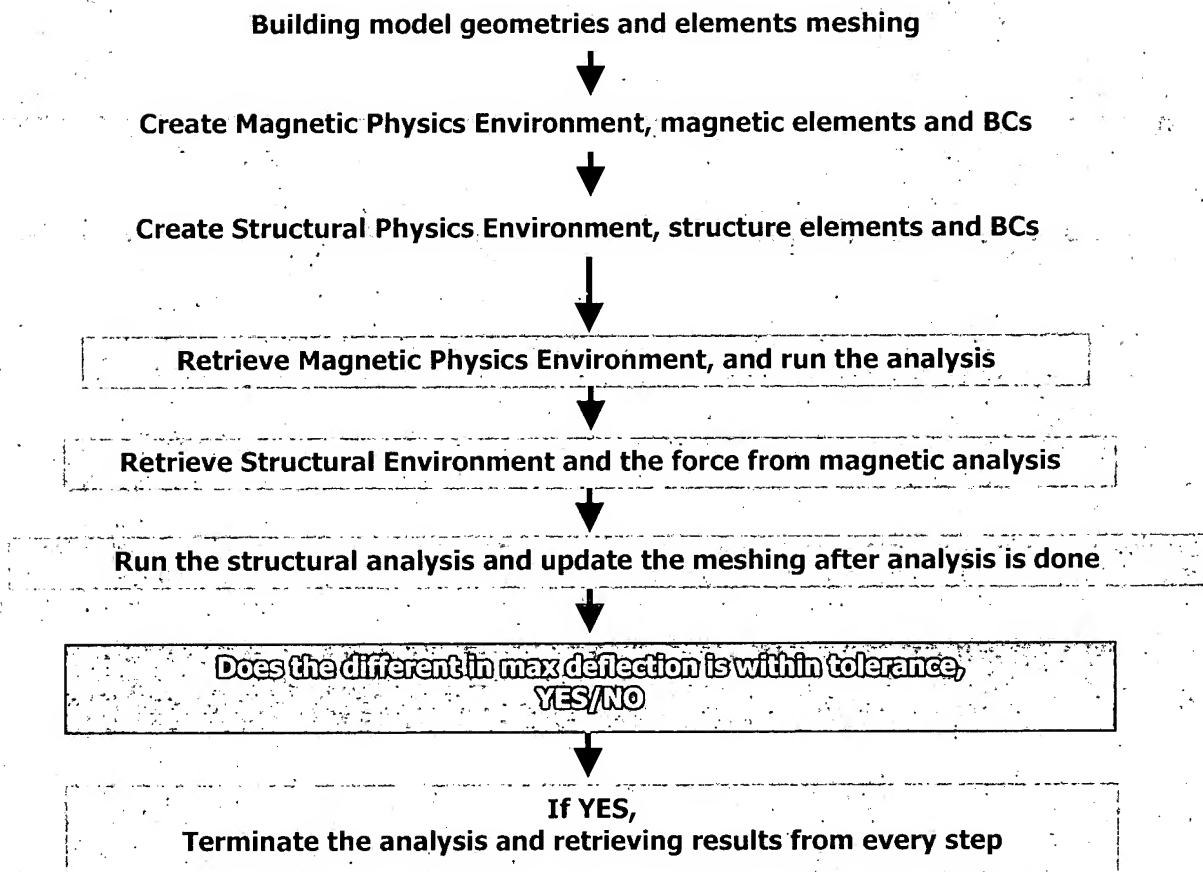
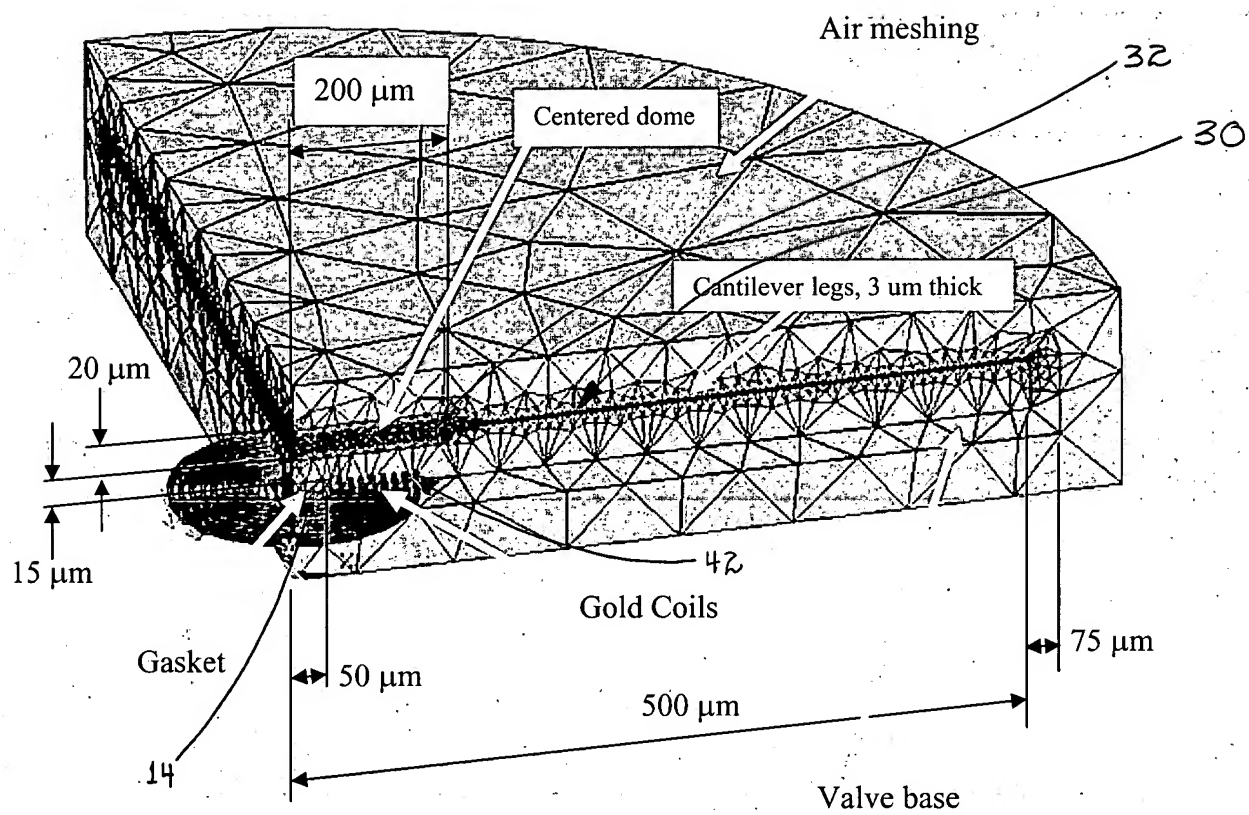


FIG. 9



**FIG. 10**



**FIG. 11**

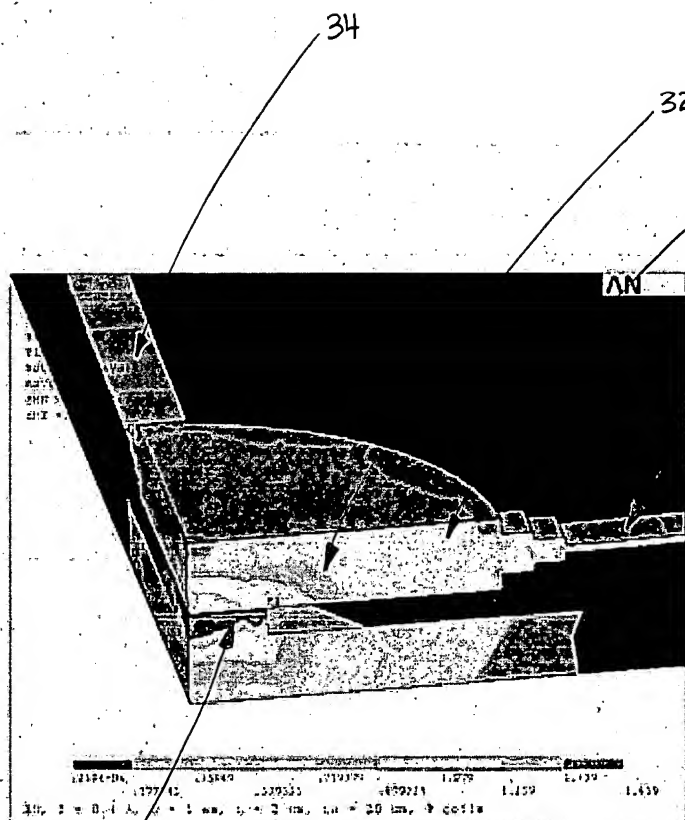


FIG.12(a)

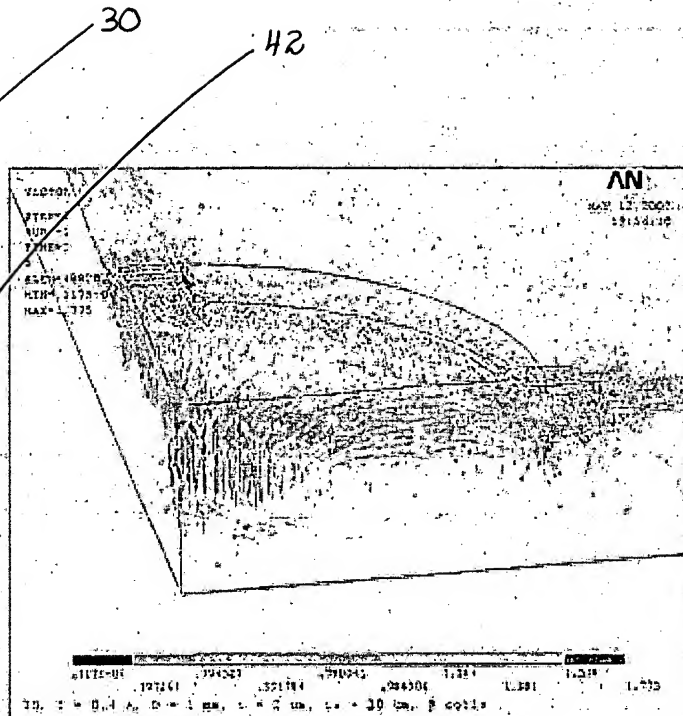


FIG. 12(b)

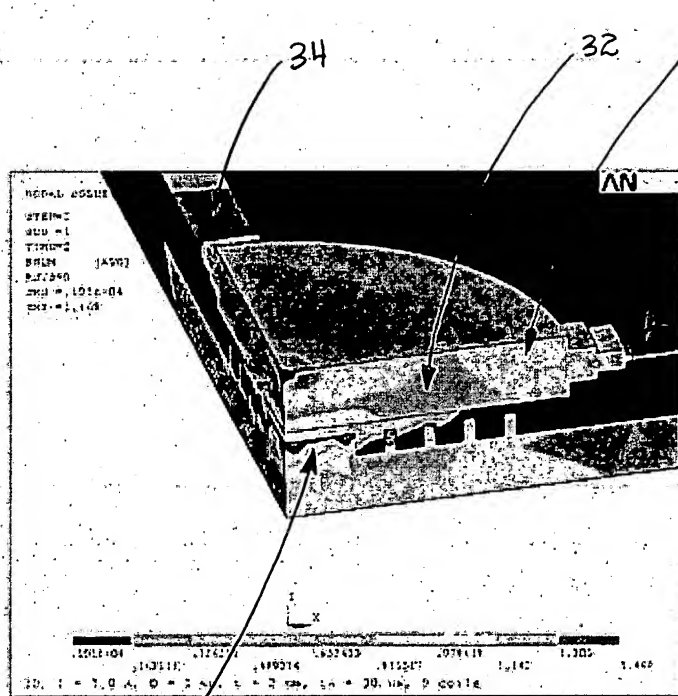


FIG. 13(a)

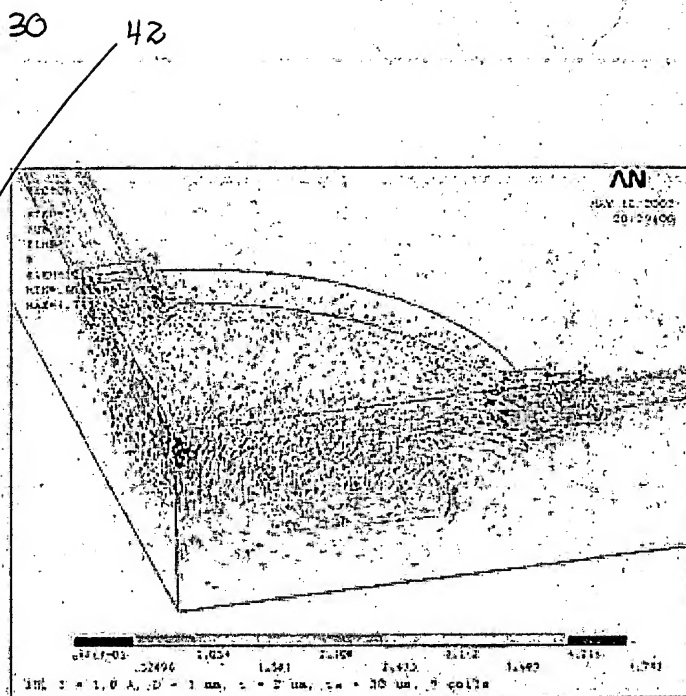
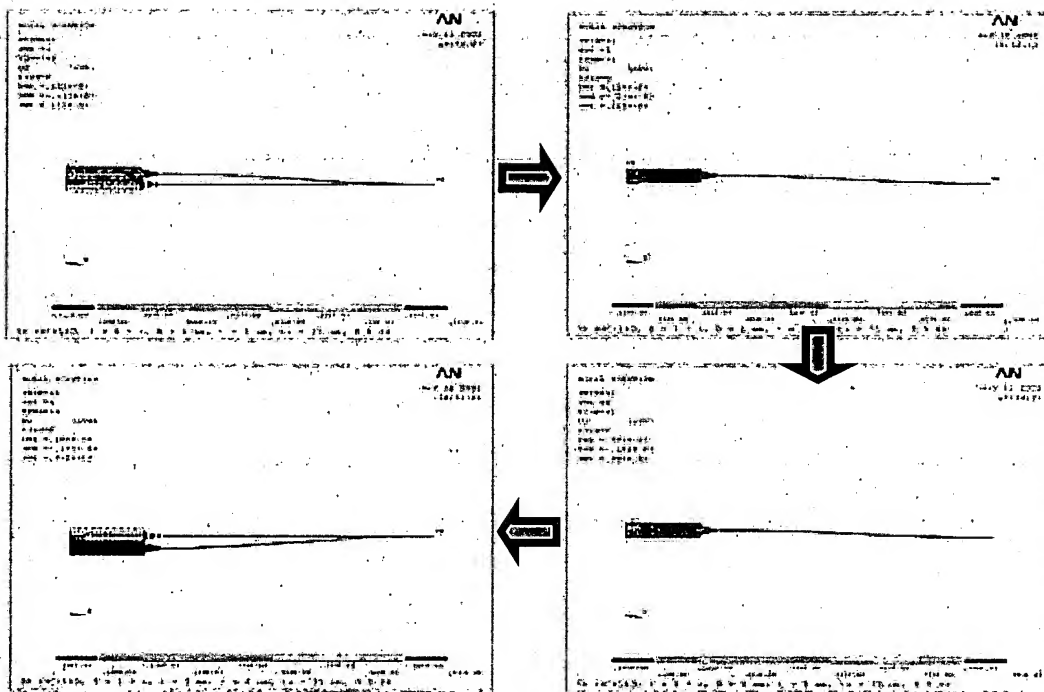
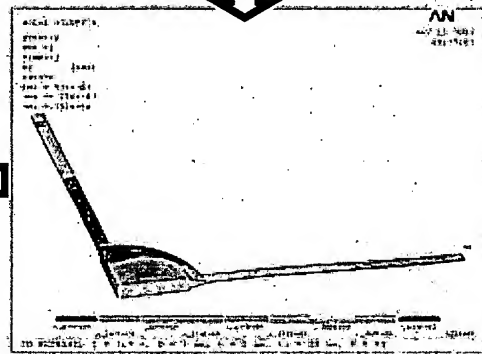
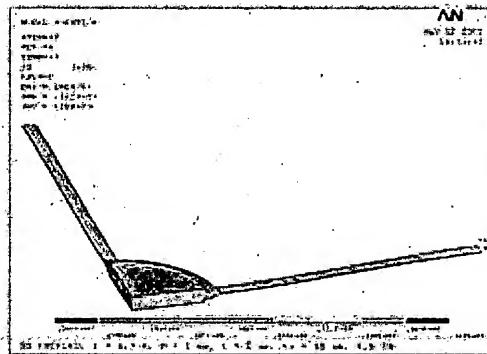
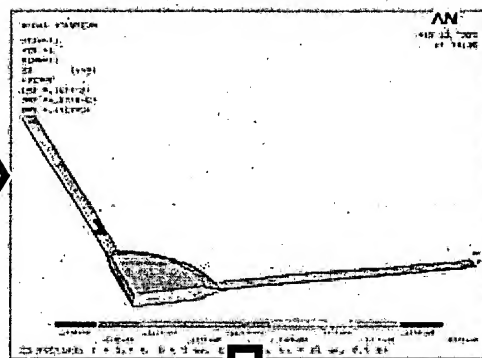
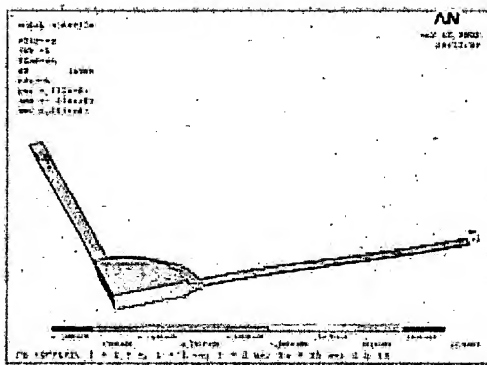


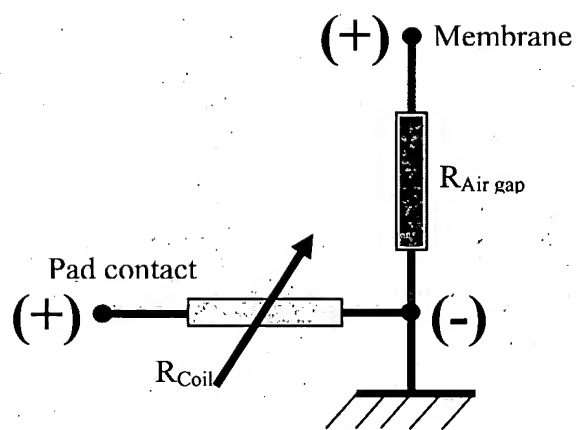
FIG. 13(b)



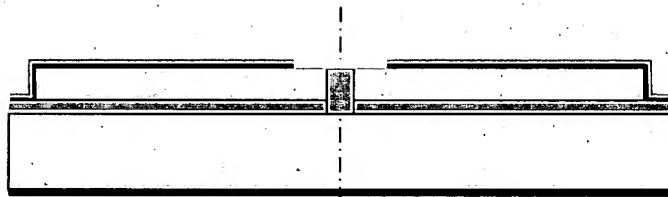
FIGS. 14(a - d)



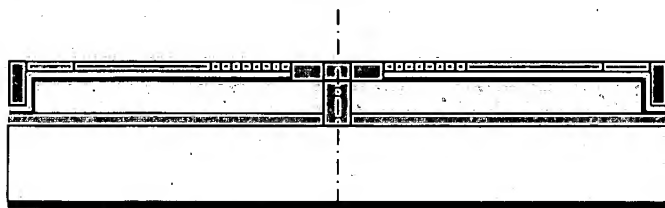
FIGS. 15(a - d)



**FIG. 16**



**FIG. 17a**



**FIG. 17b**

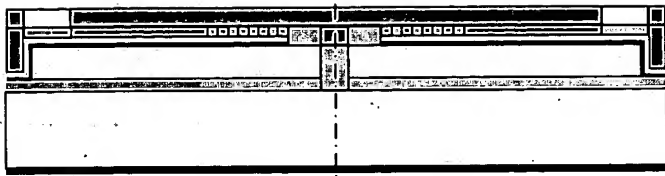


FIG. 17c

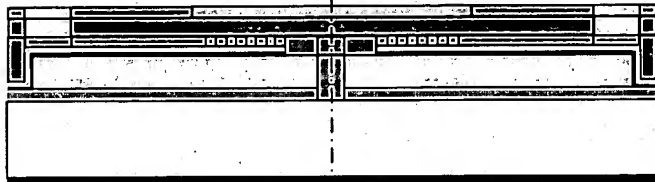


FIG. 17d

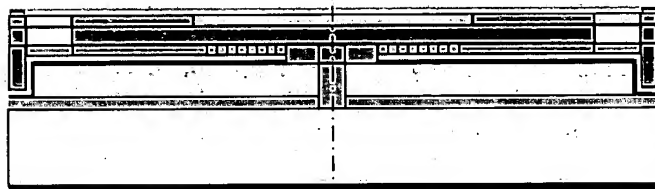


FIG. 17e

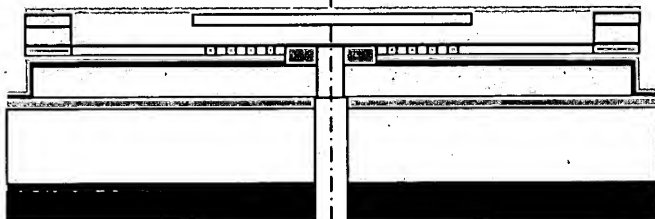


FIG. 17f

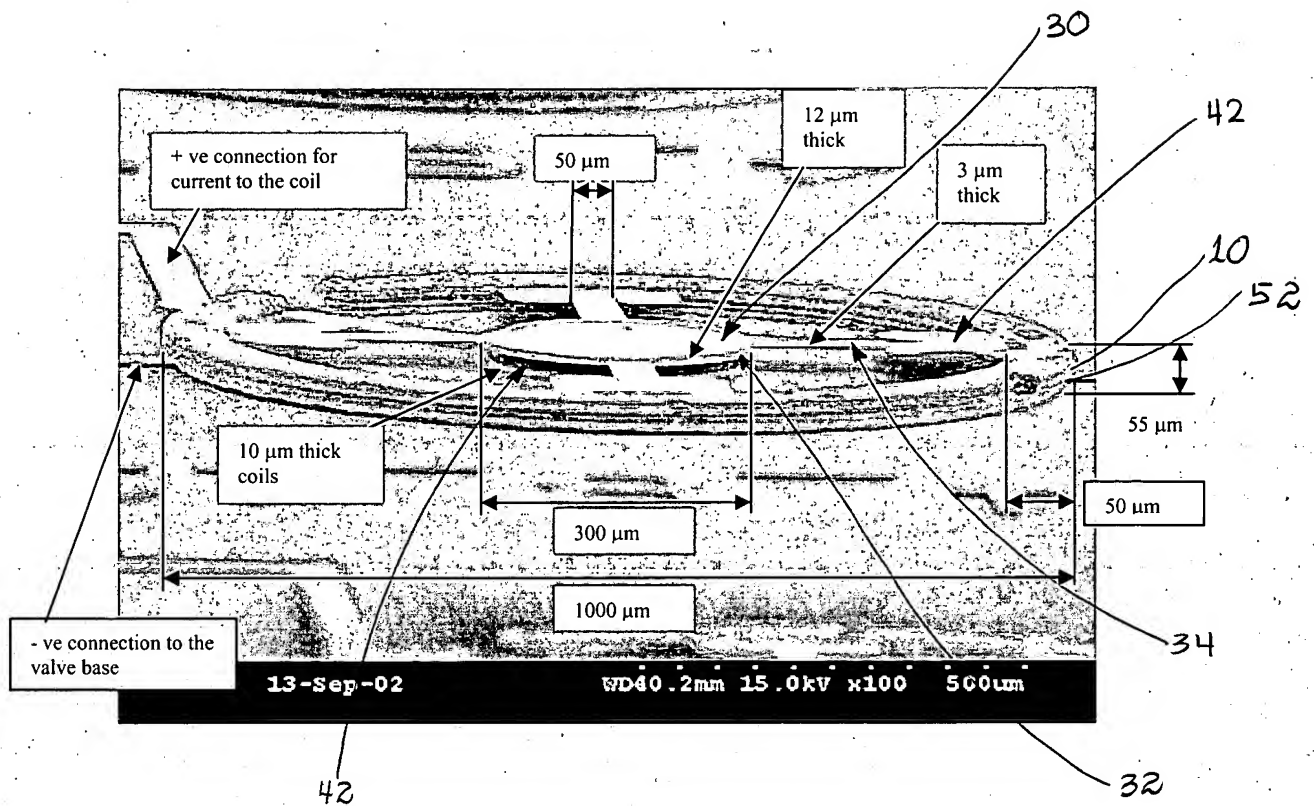


FIG. 18

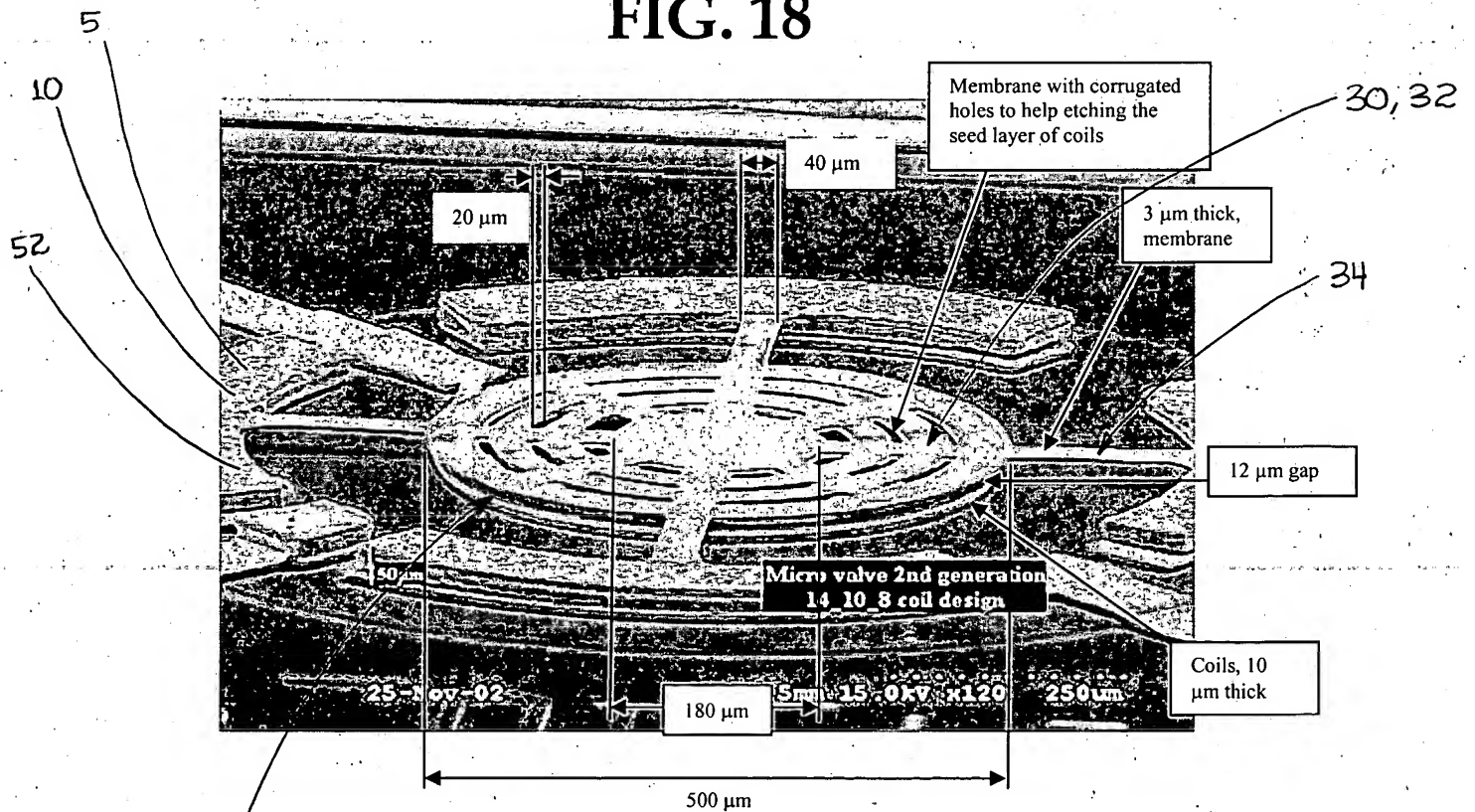


FIG. 19

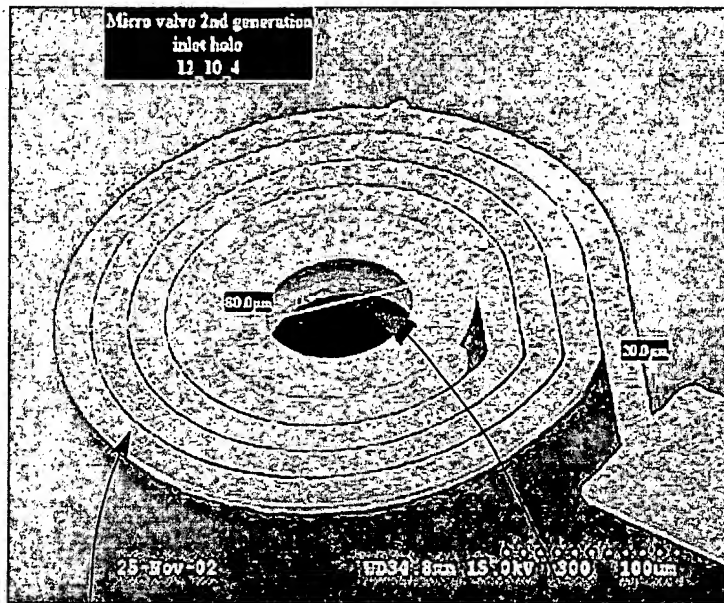


FIG. 20

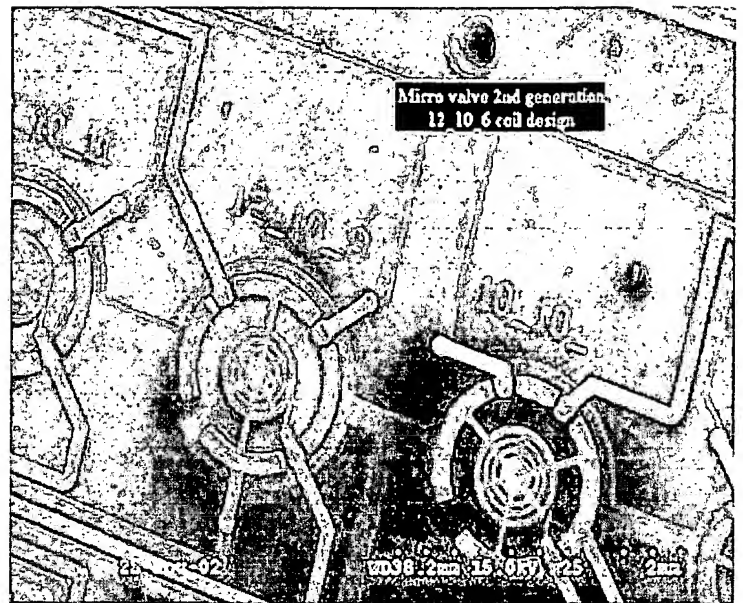


FIG. 21

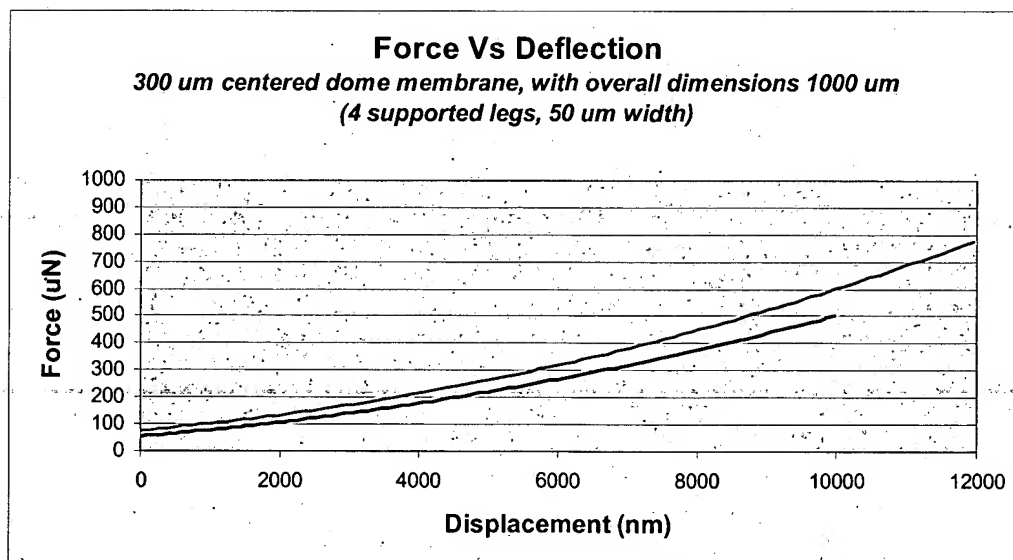
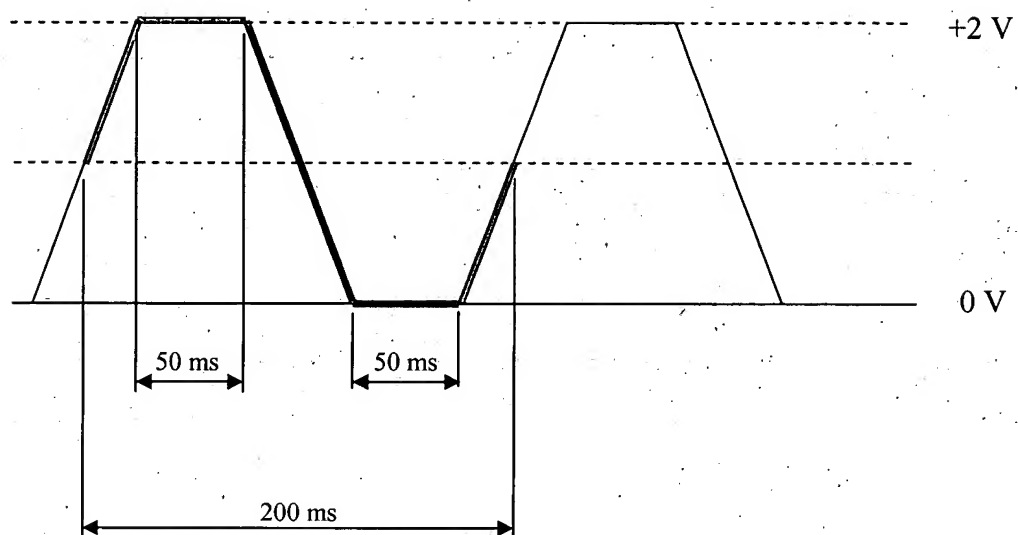
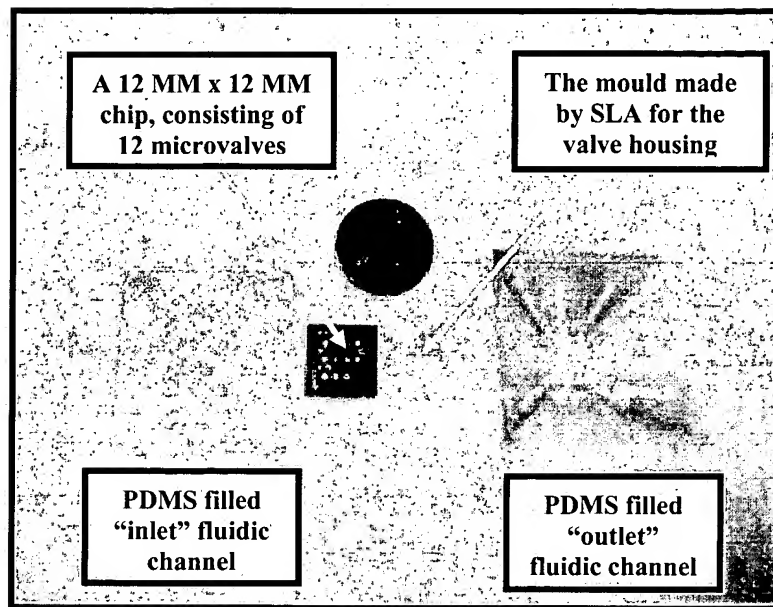


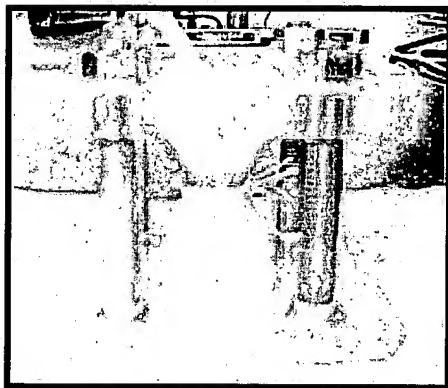
FIG. 22



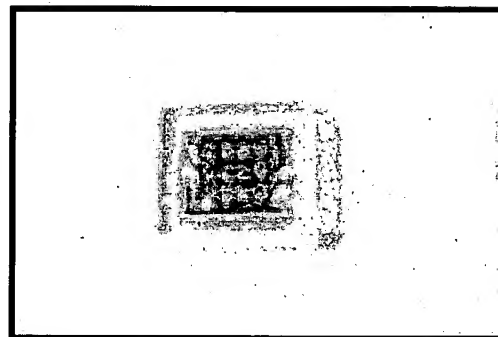
**FIG. 23**



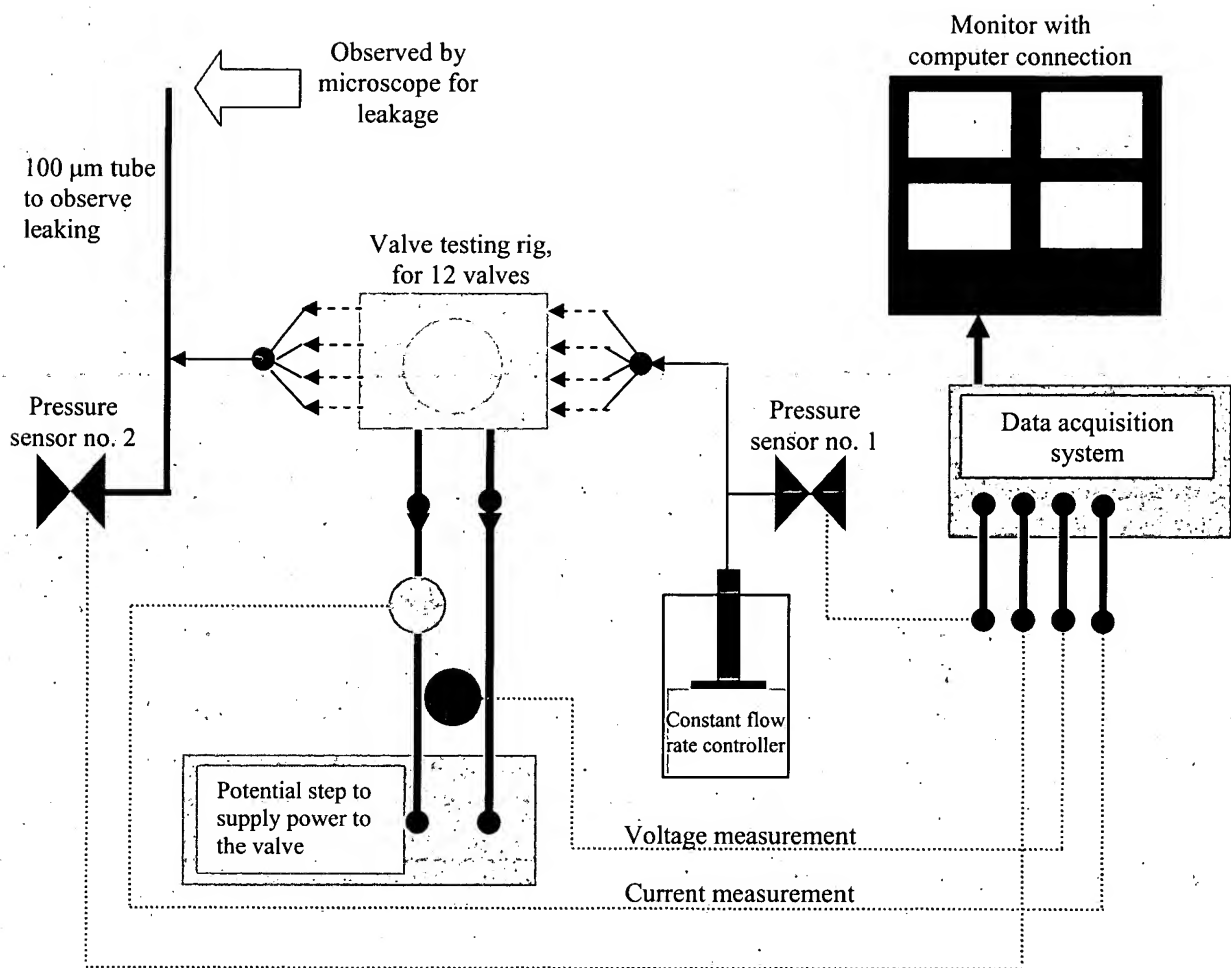
**FIG. 24(a)**



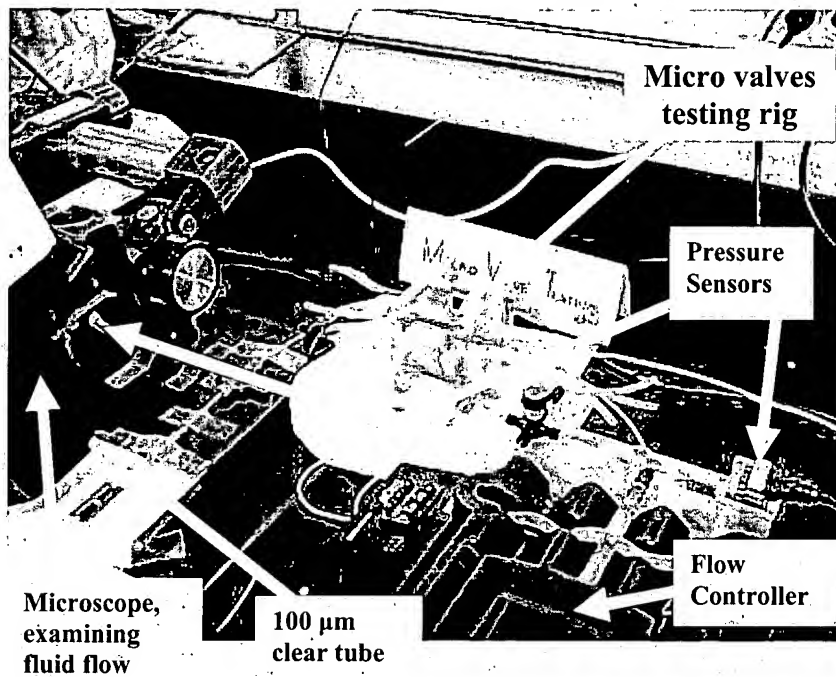
**FIG. 24(b)**



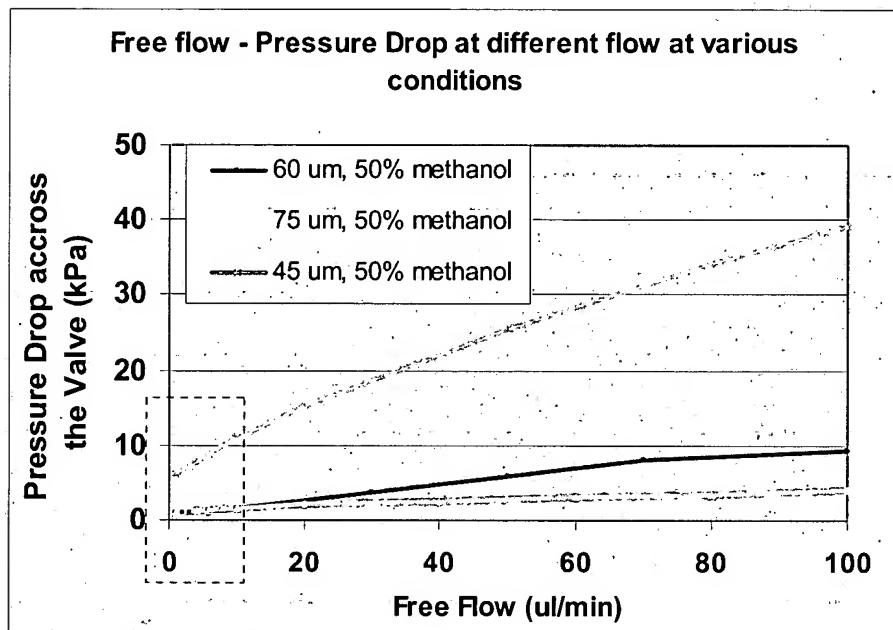
**FIG. 24(c)**



**FIG. 25**



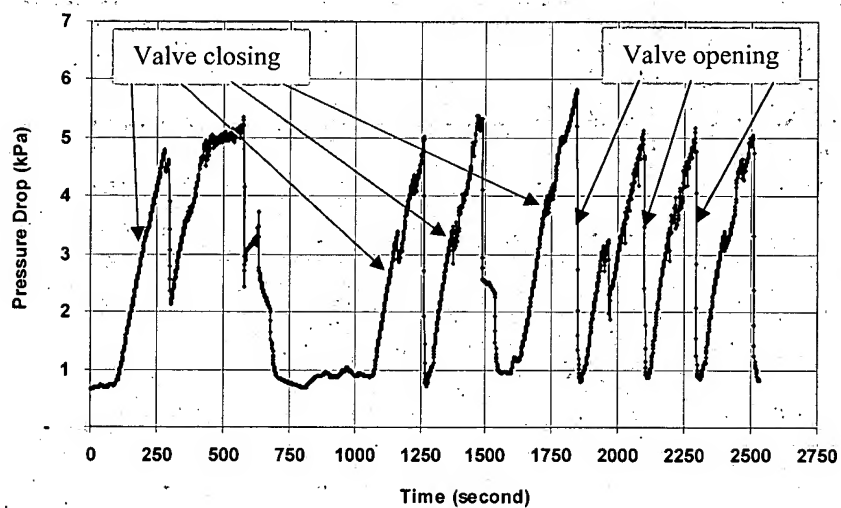
**FIG. 26**



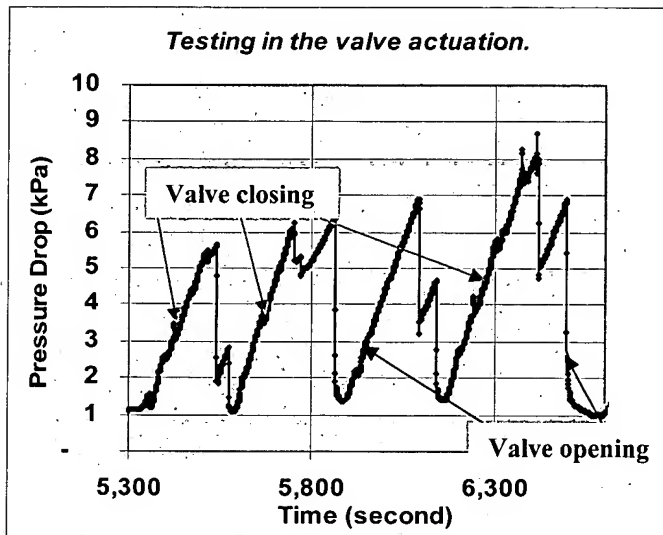
*Linear relationship here*

**FIG. 27**

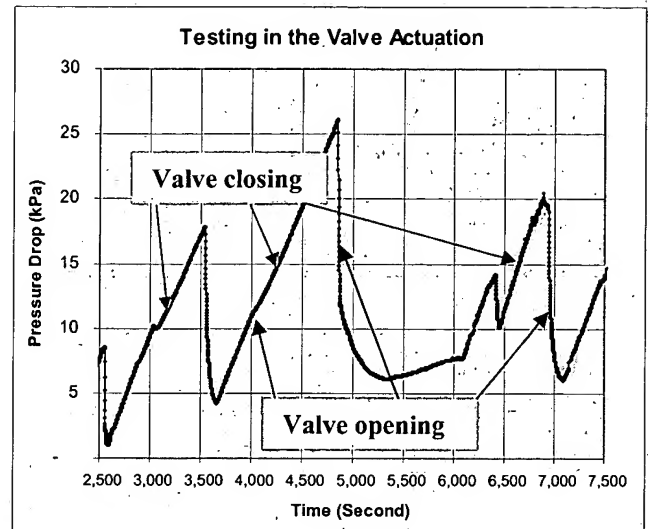
*Testing in the valve actuation; The free flow is 1 ul/min at pressure drop is 0.65 kPa; Corrugated Membrane with 4 parallel-spring-legs; Orifice diameter is 60  $\mu$ m; Coil resistance: 3.1 ohm; Voltage applied for actuation: 1.96 V.*



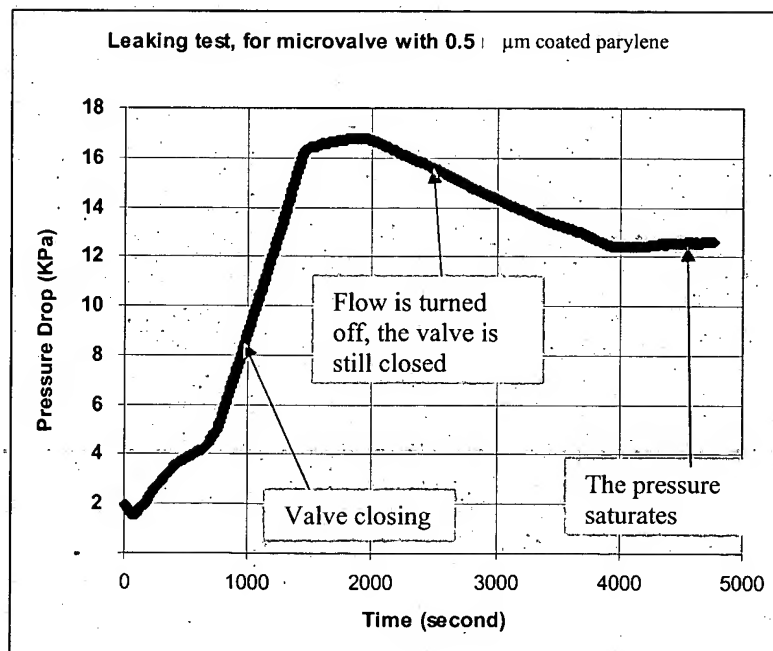
**FIG. 28**



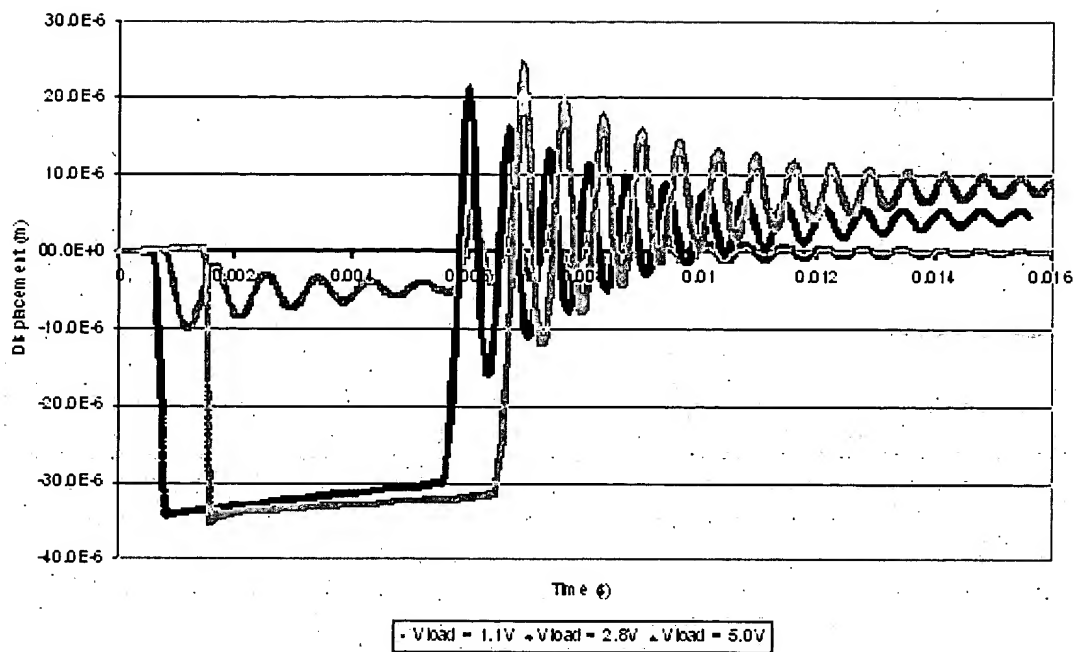
**FIG. 29**



**FIG. 30**

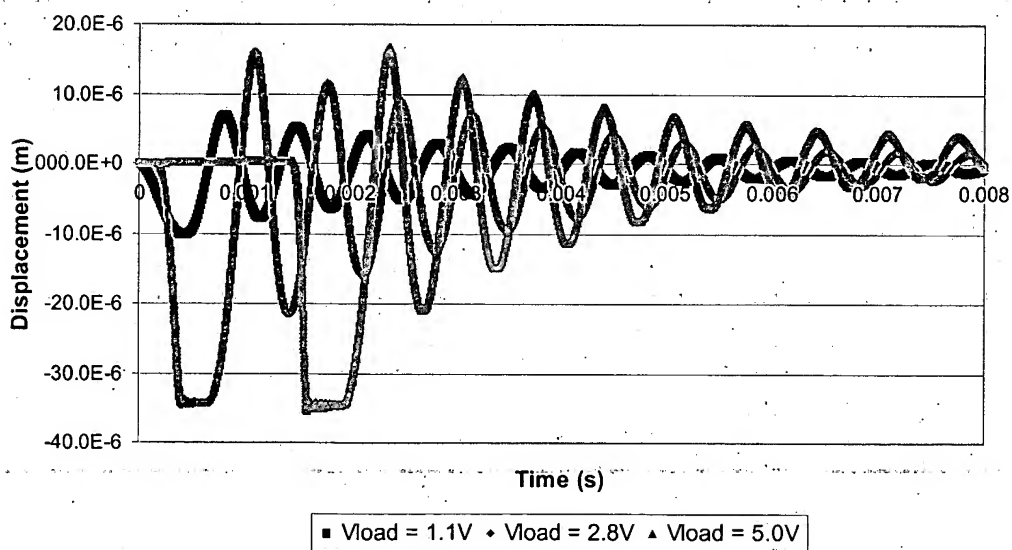


**FIG. 31**

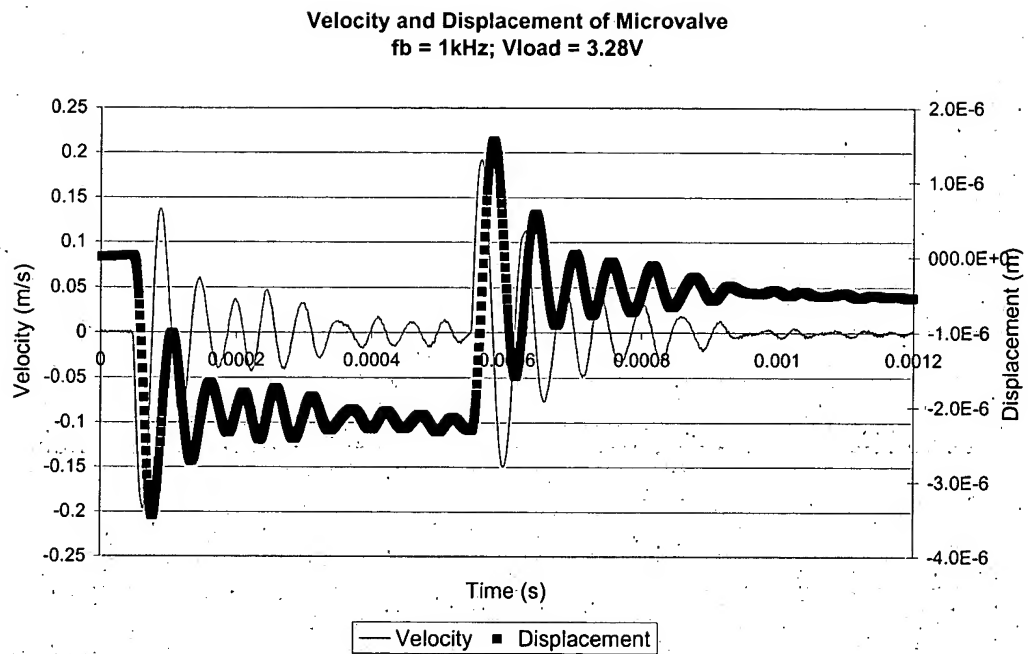


**FIG. 32**

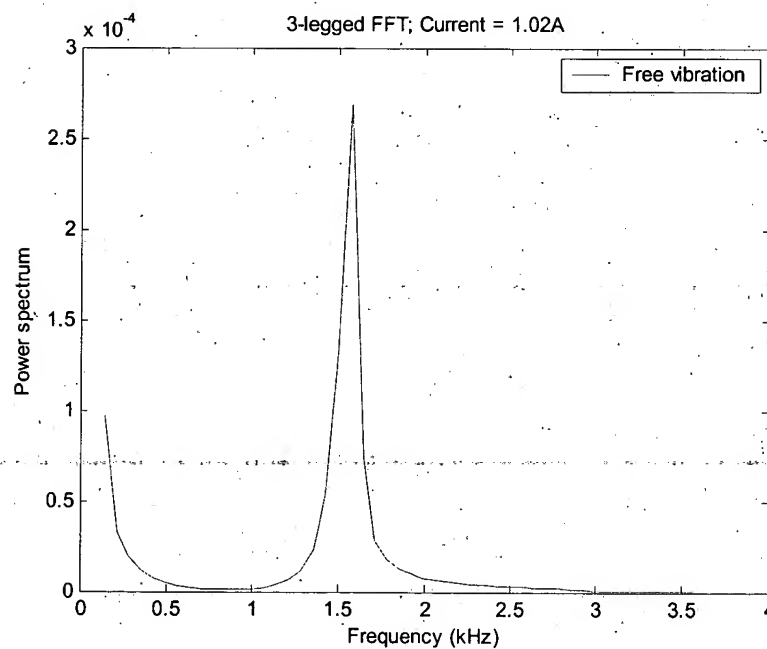
Sample of responses for varying Vload values with fb = 1kHz



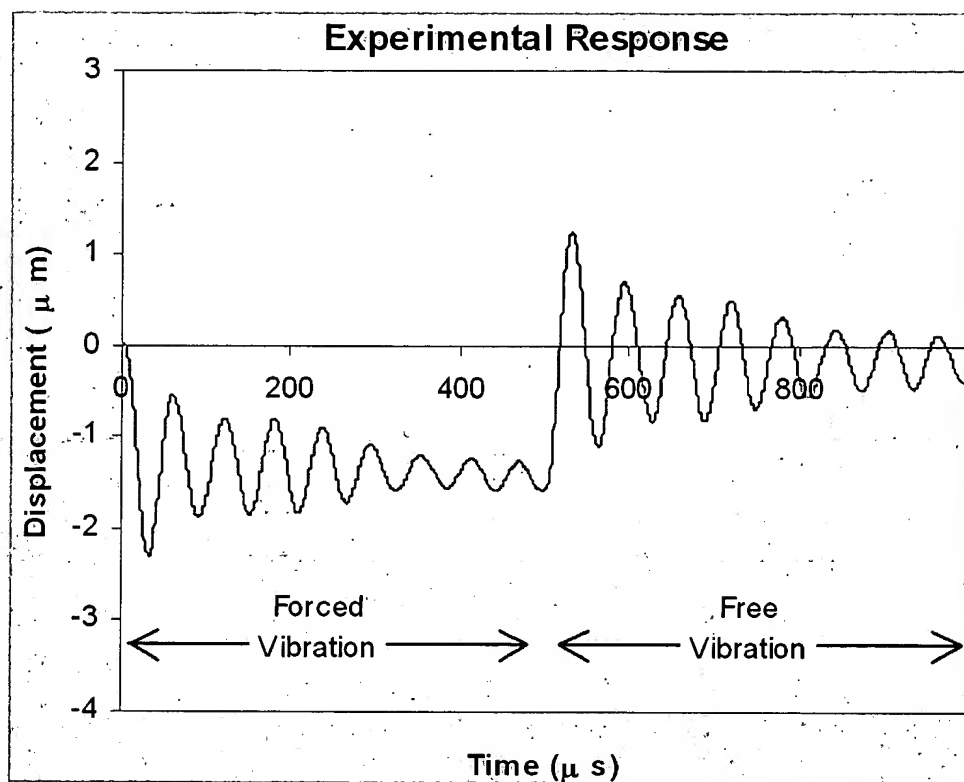
**FIG. 33**



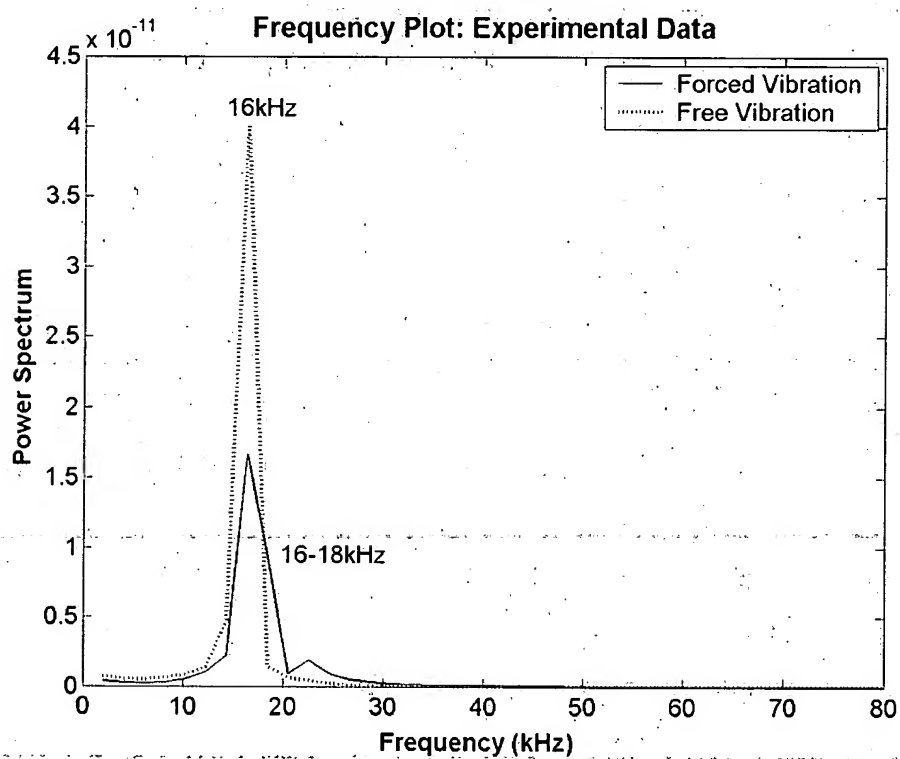
**FIG. 34**



**FIG. 35**



**FIG. 36**



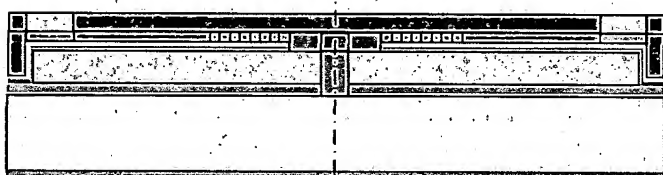
**FIG. 37**



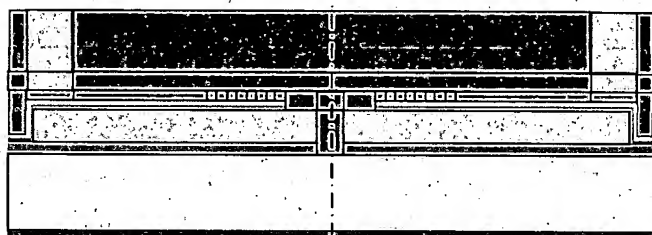
**FIG. 38a**



**FIG. 38b**



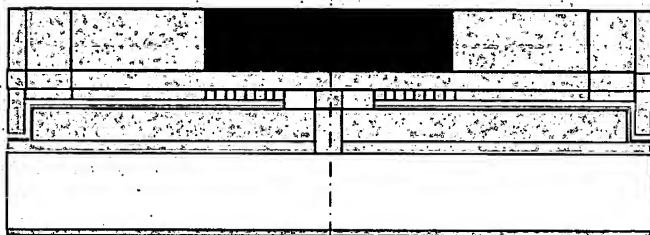
**FIG. 38c**



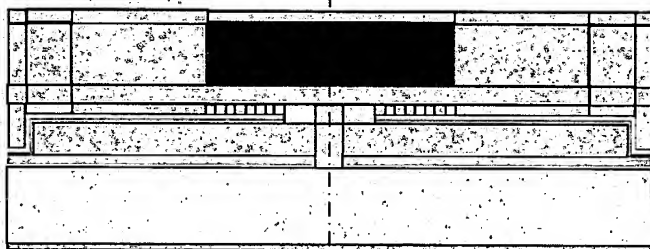
**FIG. 38d**

Legend:

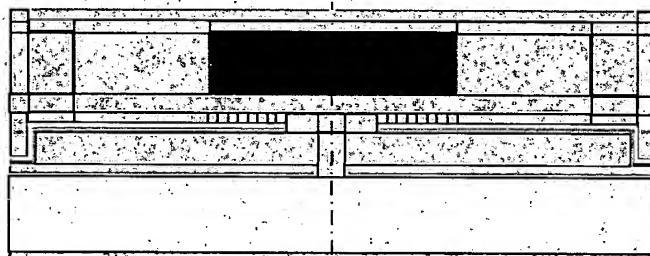




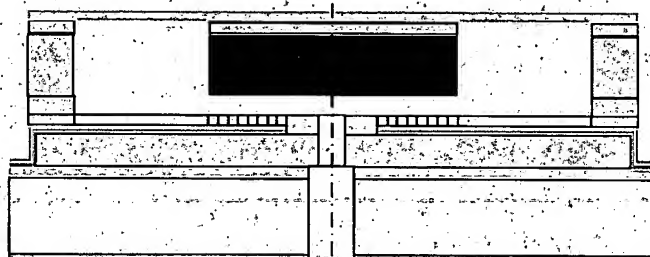
**FIG. 38e**



**FIG. 38f**

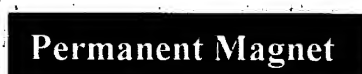
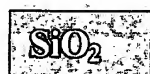


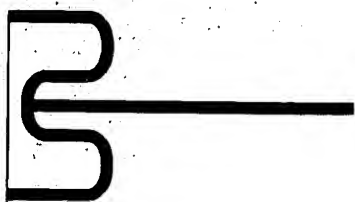
**FIG. 38g**



**FIG. 38h**

Legend:





**FIG. 39a**



**FIG. 39b**



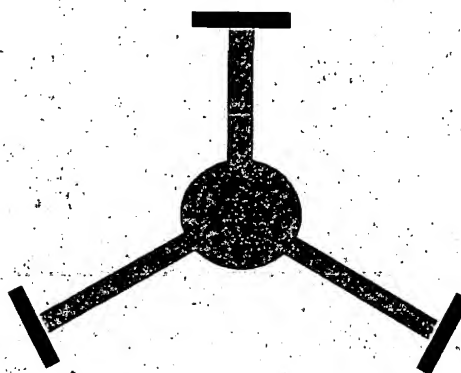
**FIG. 39c**



**FIG. 40a**



**FIG. 40b**



**FIG. 40c**

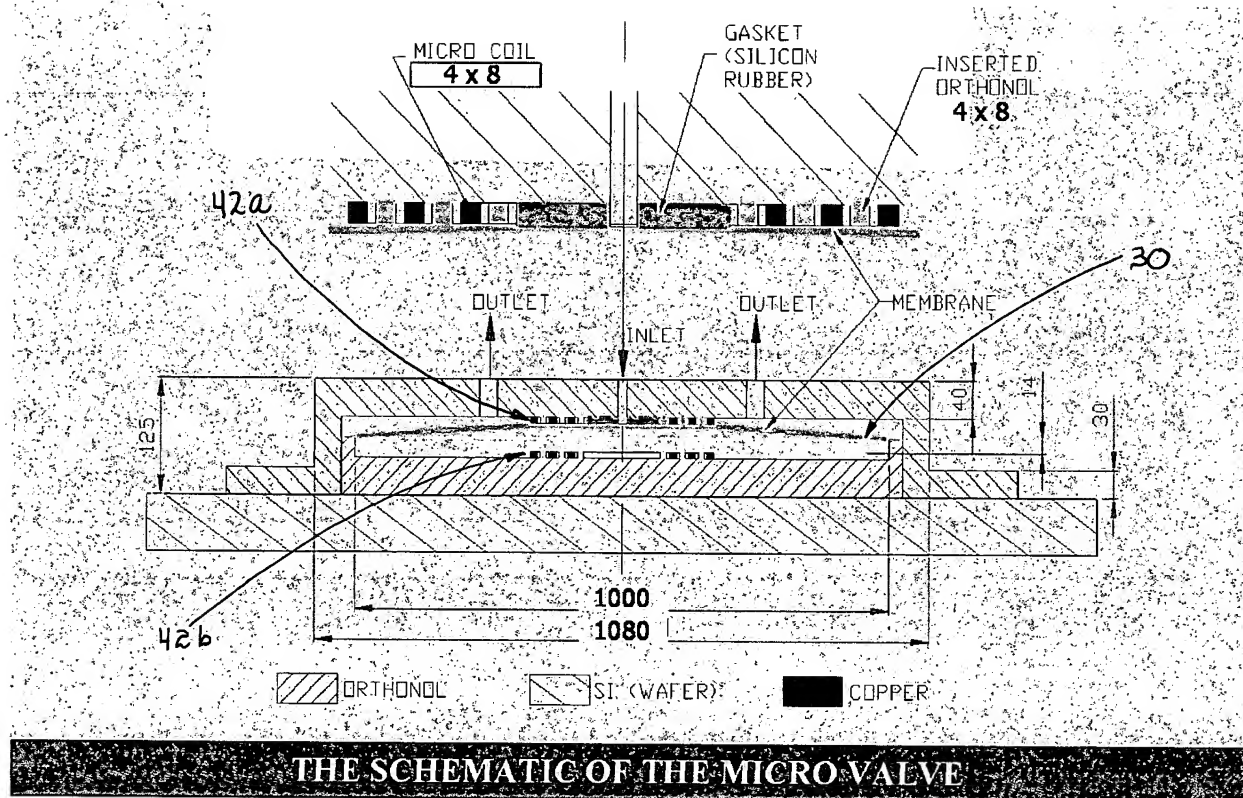
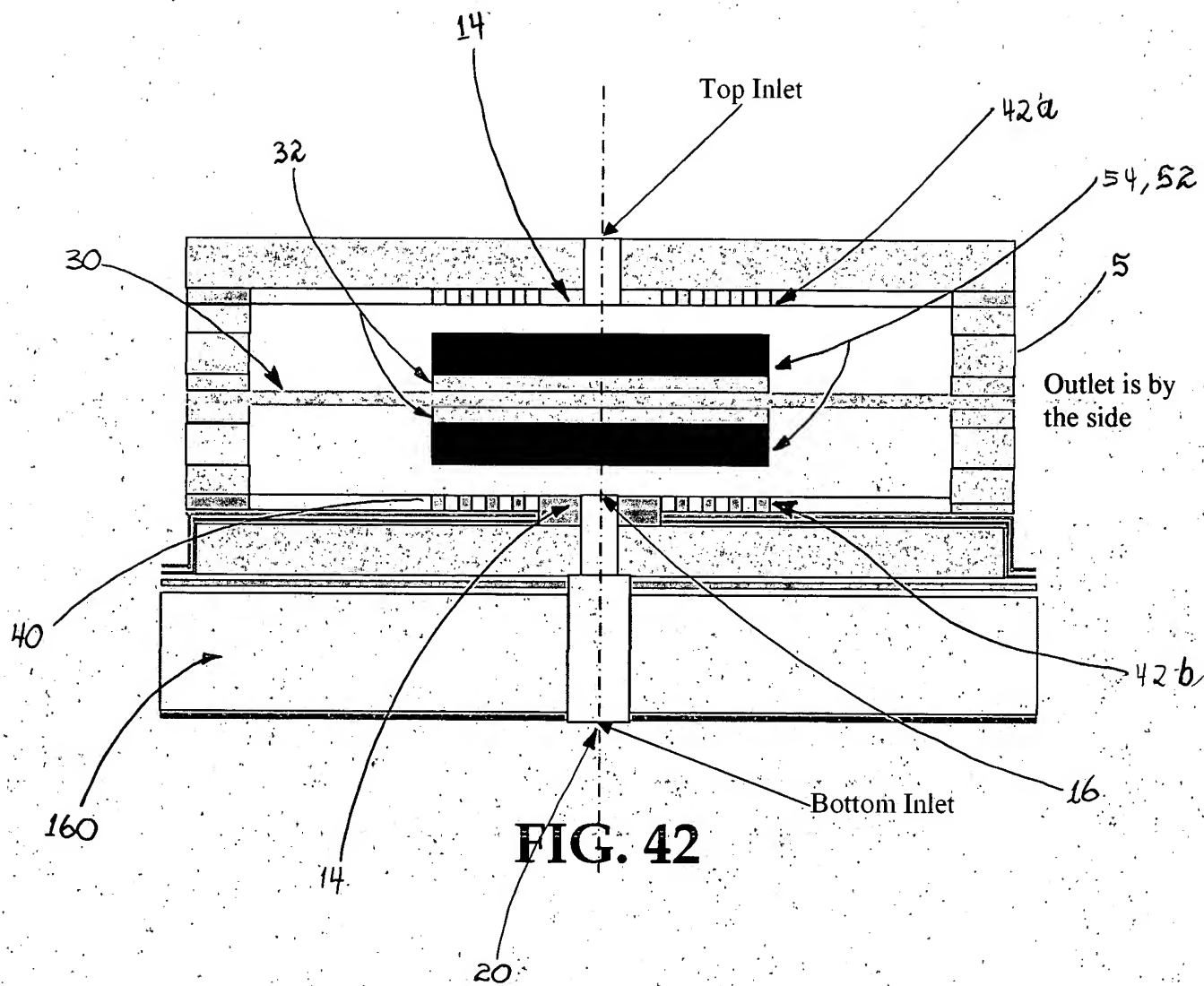
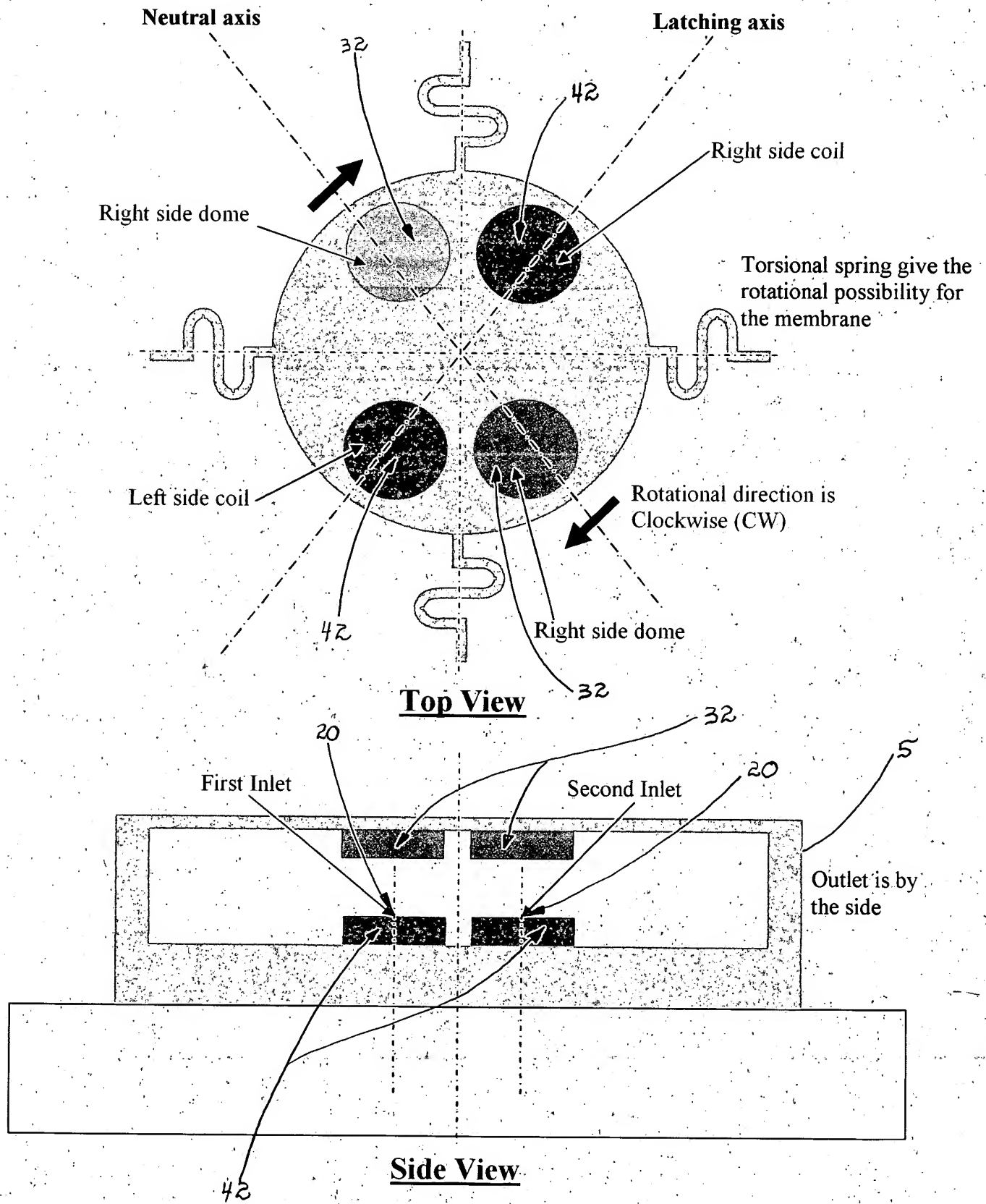


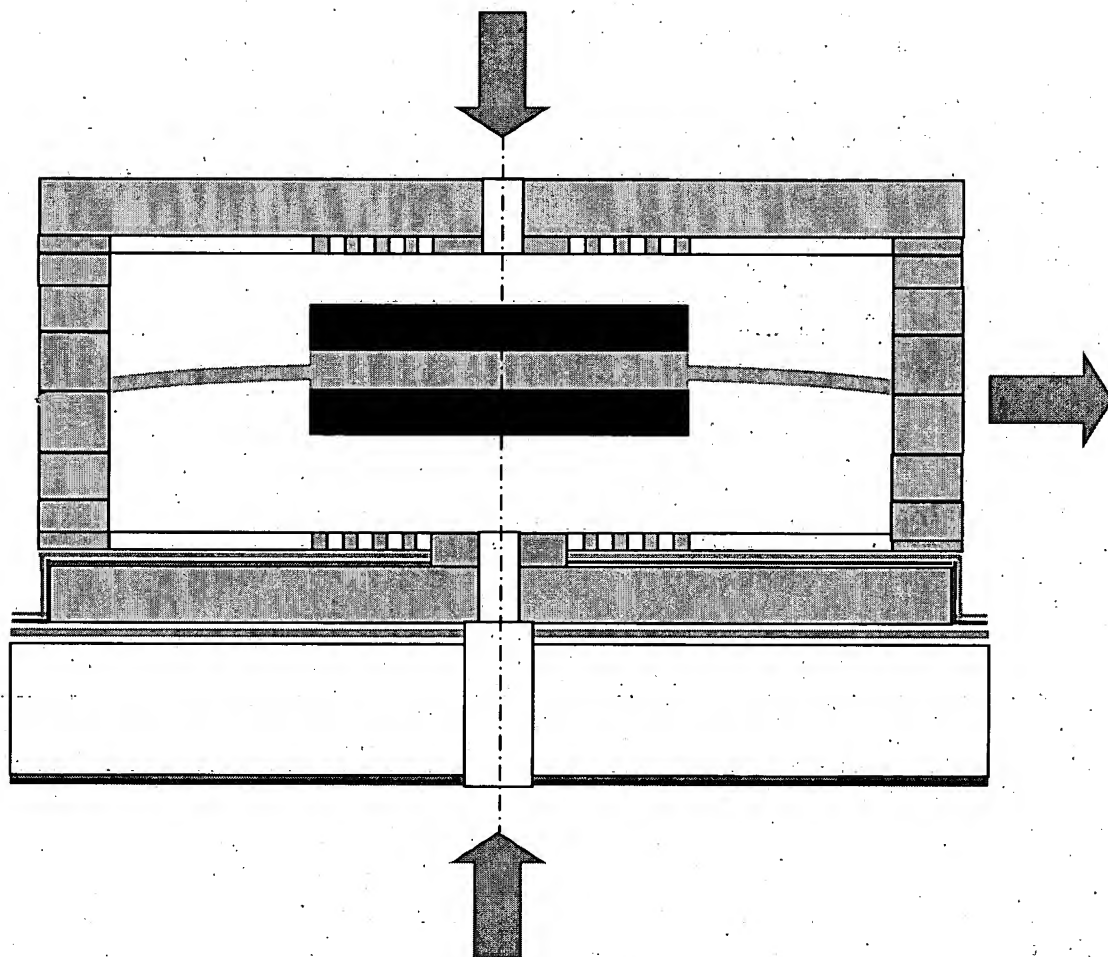
FIG. 41



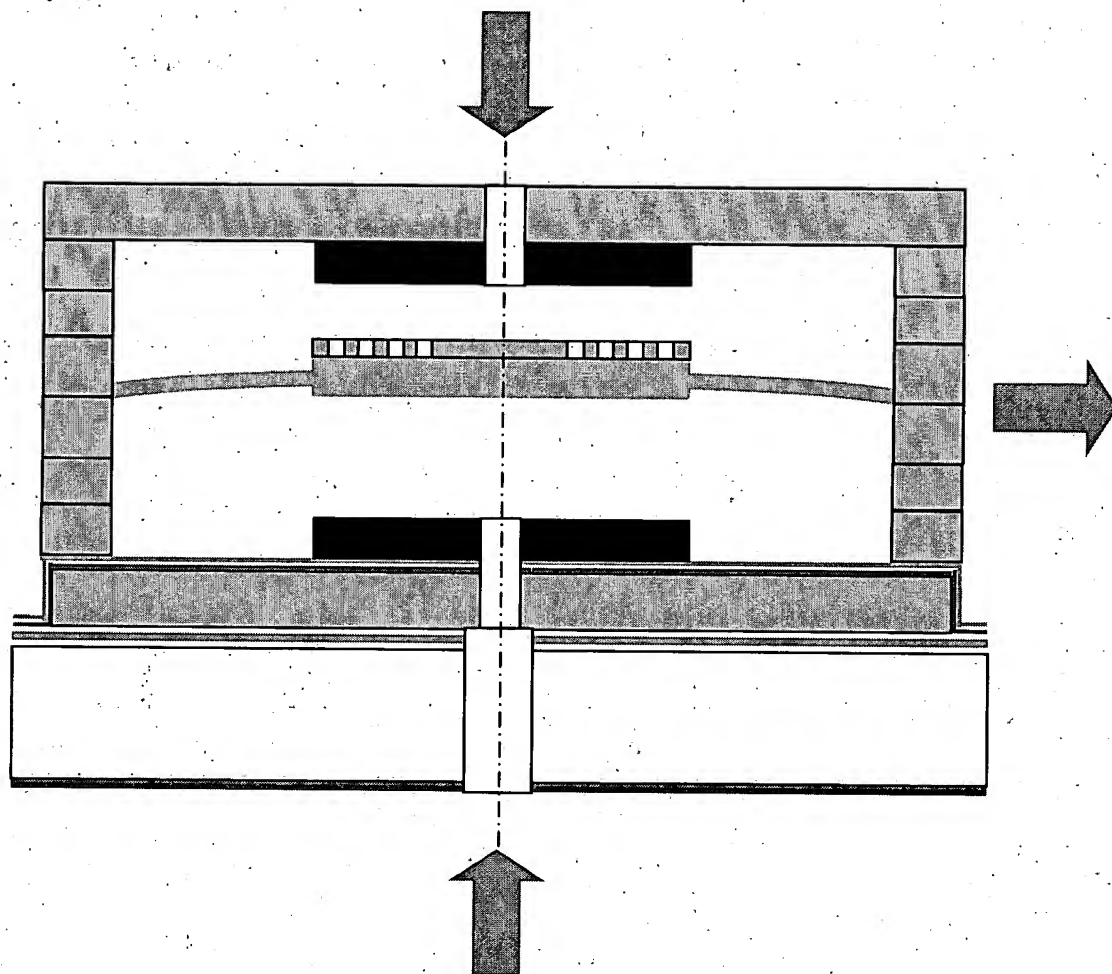
**FIG. 42**



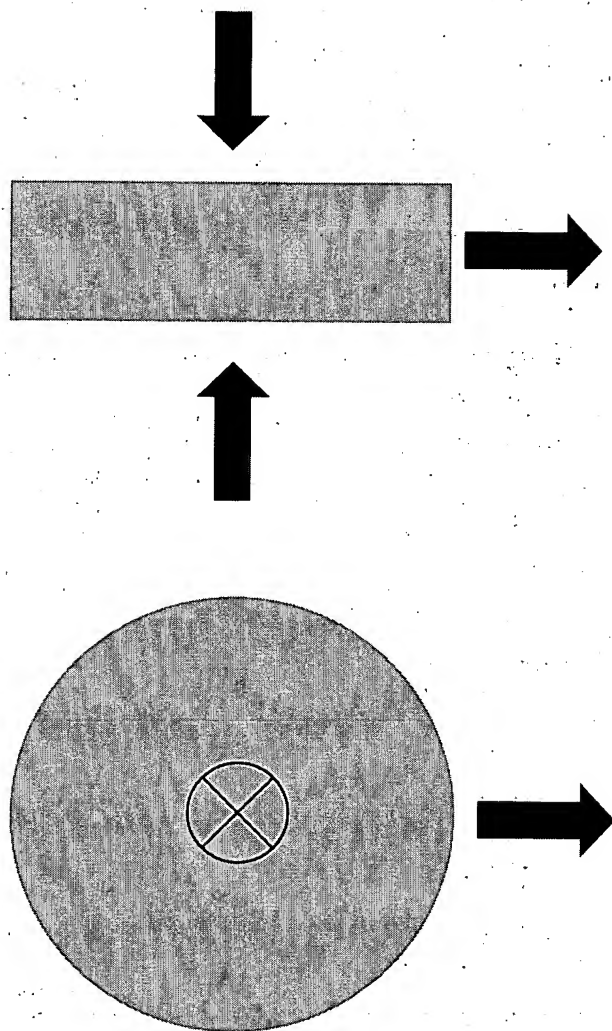
**FIG. 43**



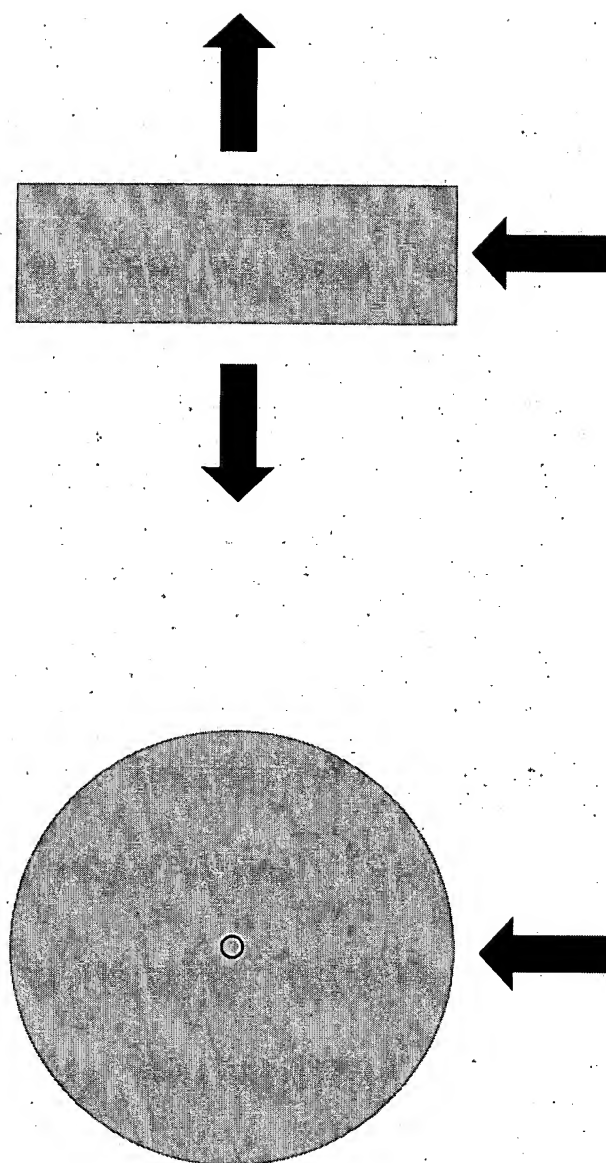
**FIG. 44**



**FIG. 45**



**FIG. 46**



**FIG. 47**

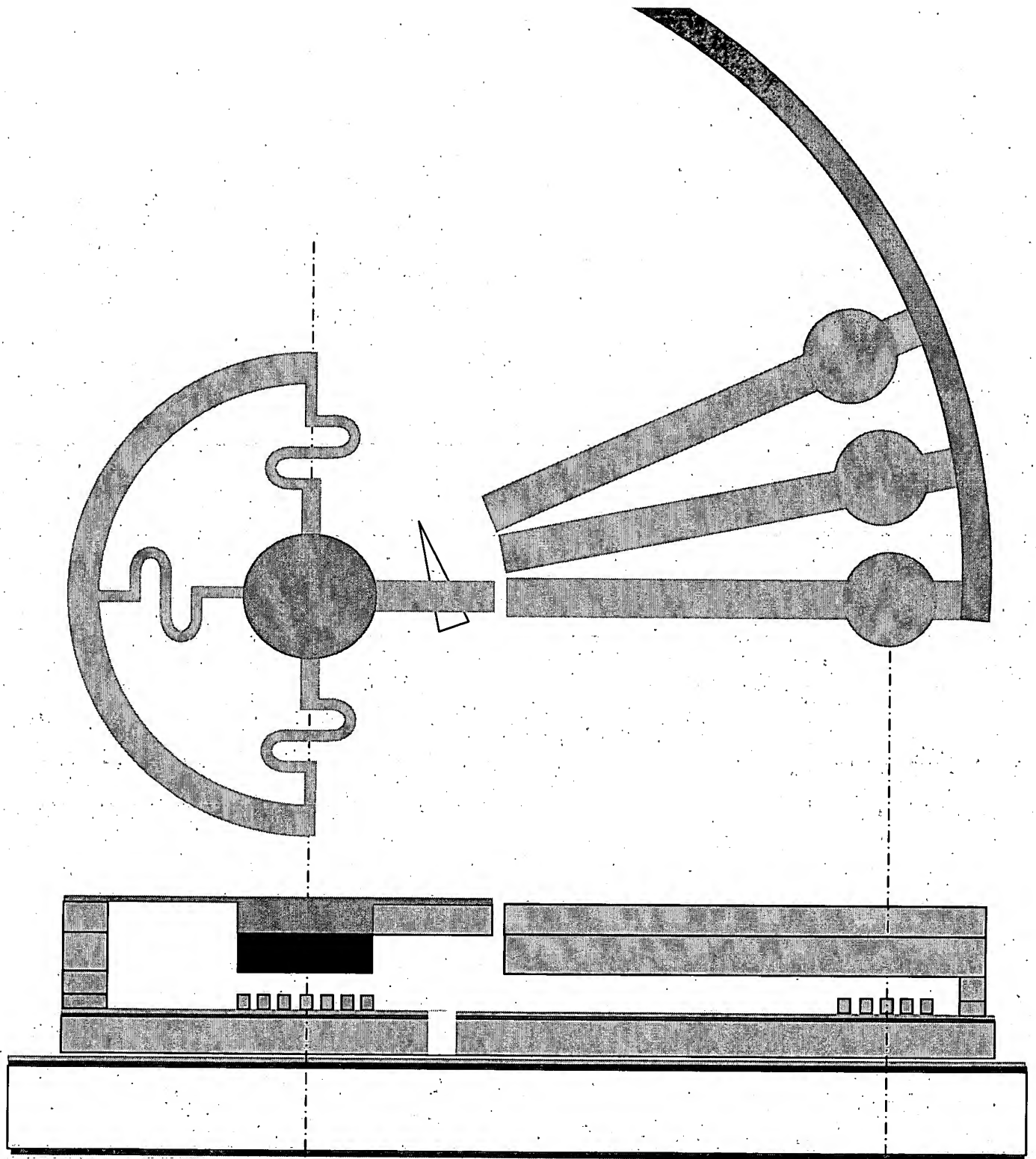


FIG. 48